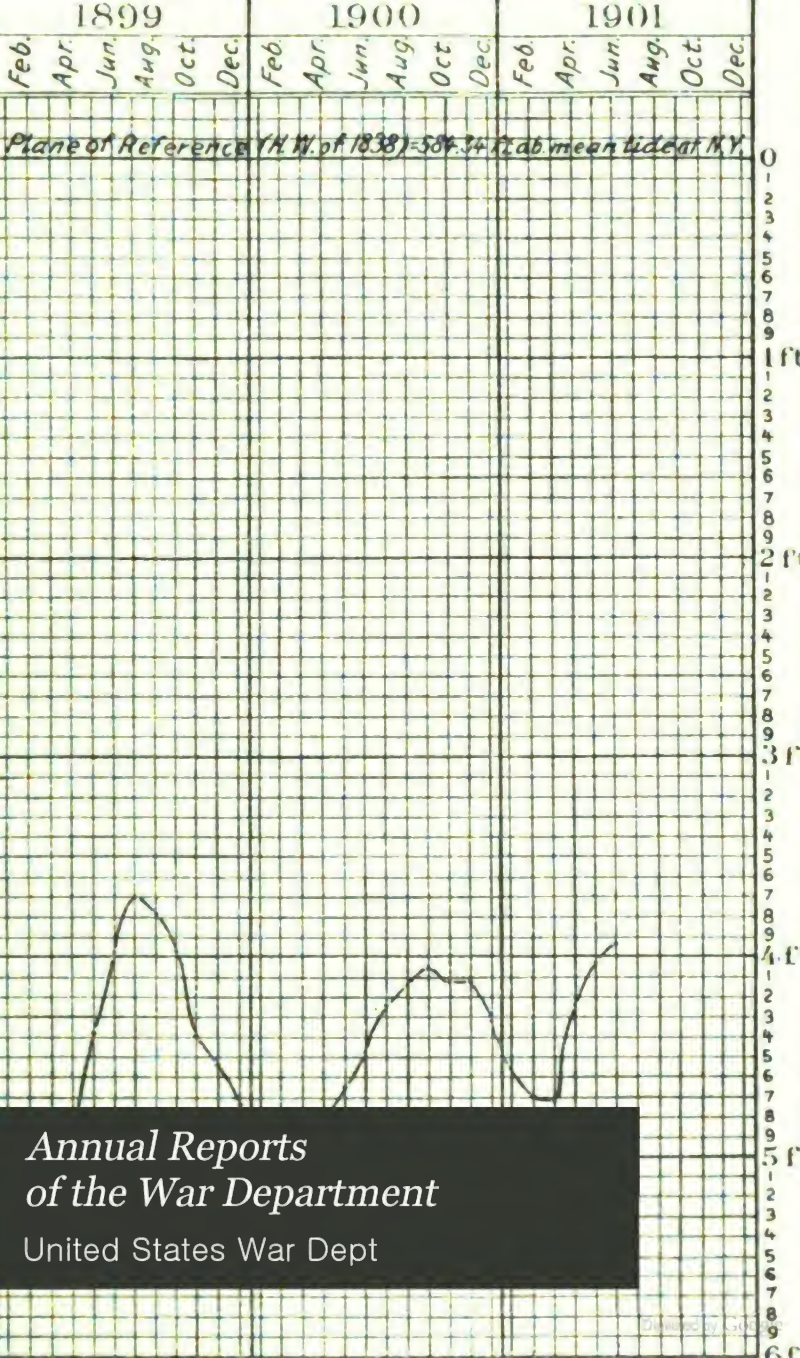

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# ANNUAL REPORTS

OF THE

# WAR DEPARTMENT

FOR THE

FISCAL YEAR ENDED JUNE 30, 1901.

REPORT OF THE

## CHIEF OF ENGINEERS.

PART 5.

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# APPENDIXES

TO THE

# REPORT OF THE CHIEF OF ENGINEERS,

UNITED STATES ARMY.

(CONTINUED.)

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# APPENDIX V V.

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## IMPROVEMENT OF CERTAIN RIVERS AND HARBORS IN WESTERN OREGON, OF UPPER COLUMBIA AND SNAKE RIVERS, OREGON AND WASHINGTON, AND OF CLEARWATER RIVER, IDAHO.

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*REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1901, WITH OTHER DOCUMENTS RELATING TO THE WORKS. OFFICERS IN CHARGE, CAPT. WM. W. HARTS AND CAPT. W. C. LANGFITT, CORPS OF ENGINEERS.*

### IMPROVEMENTS.

1. Coquille River, Oregon.
2. Coquille River, Oregon, between Coquille and Myrtle Point.
3. Entrance to Coos Bay and Harbor, Oregon.
4. Harbor at Coos Bay, Oregon.
5. Coos River, Oregon.
6. Mouth of Siuslaw River, Oregon.
7. Yaquina Bay, Oregon.
8. Yaquina Bay, Oregon, examination.
9. Tillamook Bay and Bar, Oregon.
10. Upper Columbia and Snake rivers, Oregon and Washington.
11. Columbia River at Three-mile Rapids and boat railway from The Dalles Rapids to Celilo Falls.
12. Canal at the Cascades, Columbia River, Oregon.
13. Operating and care of canal and locks at the Cascades, Columbia River.
14. Columbia River, between Vancouver, Washington, and mouth of Willamette River.
15. Clearwater River, Idaho.

### EXAMINATIONS AND SURVEYS.

16. Columbia River, Oregon and Washington, between the foot of The Dalles Rapids and head of Celilo Falls.
17. Snake River, Idaho and Washington.

### HARBOR LINES.

18. Coos Bay, Oregon.

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UNITED STATES ENGINEER OFFICE,
*Portland, Oreg., July 18, 1901.*

GENERAL: I have the honor to submit herewith annual report * * * for the fiscal year ending June 30, 1901, for works of river and harbor improvement in my charge.

Very respectfully, your obedient servant,

W. C. LANGFITT,
*Captain, Corps of Engineers.*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*

## V V 1.

## IMPROVEMENT OF COQUILLE RIVER, OREGON.

### GENERAL IMPROVEMENT.

Information concerning the project for the construction of two high-tide rubblestone jetties, so placed at the mouth of Coquille River as to cause the latter to empty into the Pacific Ocean by means of a new channel running straight out to sea and having the low-tide depth of 8 feet (equivalent to 13 or 14 feet at high tide), and information concerning the result of operations in former years, is cited in the summary of this report.

During the fiscal year ending June 30, 1901, the south jetty was completed and the old incomplete north jetty tramway and north jetty (which had in former years been built for the distance of 510 feet, but afterwards practically destroyed by heavy seas) were rebuilt throughout for the distance of 510 feet. This work was done under contract with John Kiernan, of Portland, Oreg., dated August 15, 1899. (Operations under this contract were commenced in October, 1899, and for information concerning the general requirements of the contract and the result of operations under it from October, 1899, to June 30, 1900, attention is invited to the Annual Report of the Chief of Engineers for 1900, pp. 4267-4268.) The work required under this contract was completed on March 4, 1901. Between July 1, 1900, and March 4, 1901, the contractor furnished and placed the following-named quantities of materials in the portions of the work named:

| | | |
|---|---|---|
| *South jetty.* | | |
| Rubblestone, 4,031.8 tons, at 71½ cents | | $2,882.74 |
| *North jetty tramway.* | | |
| Piles, 3,936 linear feet, at 13 cents | $511.68 | |
| Lumber, 41,692 feet B. M., at $11 | 458.61 | |
| Driftbolts, 2,137 pounds, at 7 cents | 149.59 | |
| Ship spikes, 136 pounds, at 7 cents | 9.52 | |
| Old rails relaid, 10.2 tons, at $8 | 81.60 | |
| Railroad spikes, 540 pounds, at 7 cents | 37.80 | |
| Bolts for fish plates, 30 pounds, at 11 cents | 3.30 | |
| | | 1,252.10 |
| *North jetty.* | | |
| Brush mattresses, 1,221.16 cubic yards, at $1.15 | $1,404.33 | |
| Rubblestone, 16,126.65 tons, at 71½ cents | 11,530.55 | |
| | | 12,934.88 |
| Gross amount earned by contractor | | 17,069.72 |
| Less deductions for rent of Government plant, eight and four-thirtieths months, at $100 per month | $813.33 | |
| Less deduction made for value of Government plant which the contractor failed to return upon completion of the contract | 189.85 | |
| Less deduction made for expenses of United States for inspection of work, etc., placed after the date named for completion of the contract | 468.00 | |
| | | 1,471.18 |
| Net amount paid contractor for materials furnished and placed during the fiscal year | | 15,598.54 |

The placing of the above-named materials resulted in completing the south jetty, in rebuilding the incomplete north jetty tramway throughout the distance that it had been built in former years, and in rebuilding the old incomplete north jetty for the same distance.

The south jetty as completed during the past year is about 2,700 feet long (the sea end being at tramway bent No. 68), and the incomplete north jetty tramway and north jetty as rebuilt being 510 feet long (the sea end of the tramway and jetty being at tramway bent No. 34). It is estimated that to accomplish the improvement contemplated by the existing project the north jetty should be about 1,500 feet long when completed.

During the past year brush mattresses were placed by the contractor, as a foundation for the north jetty, throughout the 510 feet between the shore end and the present sea end of the jetty. These mattresses were 22 feet wide, 22 feet long, and averaged 2½ feet thick after being compressed. The mattresses were constructed as follows: A grillage, composed of poles about 5 inches in diameter laid 4 feet apart and crossed at right angles with similar poles at 4-foot intervals, was first constructed, the poles in the grillage being lashed securely together at each crossing with No. 12 galvanized annealed iron wire. Upon this grillage the mattress was built, consisting of three layers of brush fascines, the layers being laid at right angles to each other. The three layers of fascines were then topped with another grillage of poles similar to the bottom grillage, described above. The entire mattress was then compressed as much as possible and the upper and lower grillages lashed together with manila rope. Except at the extreme shore end of the jetty, where they were built directly in place, the mattresses were built by suspension from the tramway, being lowered into position and sunk by weighting them with stone. Side mattresses, also, were placed on the channel or south side of the line of the north jetty in the 200 or more feet between tramway bents Nos. 20 and 34. These side mattresses were similar to the center mattresses, excepting that they were only about 18 feet wide. They were built on skids placed on the top of the tramway, from which they were launched and sunk in place. In a few instances they were built directly in place, the tide being very low and the sea smooth.

The stone placed in the south jetty during the past year was taken by the contractor from Tupper Rock, a huge bowlder near the shore end of the south jetty, a portion of which bowlder is owned by the United States and the remainder by the contractor. As in former years, this stone was loaded on dump cars at the quarry, hauled out on the tramway by means of a small locomotive to the proper point over the jetty, and then dumped along the line of the jetty below. The south jetty was completed August 1, 1900.

The contractor commenced the work of rebuilding the incomplete north jetty tramway July 8, 1900, and completed the 510-foot section December 30, 1900. This structure is similar to the south jetty tramway, the bents being placed 15 feet apart, each bent consisting of 4 piles driven to an average penetration of about 10 feet, capped by a 12 by 12 inch timber 22 feet long, and carrying a double track, the gauge of each track being 3 feet. The rails were spiked to 12 by 14 inch stringers 30 feet in length, driftbolted to the caps.

The delivery of the rubblestone for rebuilding the 510-foot section of the north jetty was begun by the contractor September 11, 1900, and the enrockment was fully completed throughout the 510 feet on February 25, 1901. The stone placed in the north jetty was obtained by the contractor from a new quarry on the north bank of Coquille River, about 13 miles above the mouth of the latter, and on land owned by John Donaldson, from whom it was leased by the contractor. The quarry is a sandstone formation, and the rock weighs about 149 pounds per cubic foot. The stone was loaded on scows at the quarry by a derrick. The scows had a carrying capacity of 200 tons each. They were towed between the quarry and the wharf near the shore end of the north jetty by the contractor's tugboat. At this wharf a derrick transferred the stone from the scows to dump cars. The latter were then hauled by a small locomotive over an elevated track connecting the wharf with the shore end of the north jetty tramway, and the stone dumped from the tramway along the line of the jetty below.

The cars loaded with stone for the jetties were weighed by means of track scales.

In connection with the north jetty work, the contractor built, at his own expense, a receiving wharf and about 1,100 feet of elevated tramway leading from the wharf to the shore end of the north jetty tramway. Under the terms of the contract, this wharf and tramway became the property of the United States.

The average number of men employed each day by the contractor on the work during the past year was about 25.

The Government plant rented to the contractor for his use in carrying on the work under the contract, was returned to the United States on March 4, 1901, excepting a few articles, the value of which was deducted from the final payment made to the contractor. This plant has been in use for a number of years and is now in need of more or less repairs.

Since the work of rebuilding the 510 feet of the old incomplete north jetty was completed, in February, 1901, the depth in the new bar channel has ranged from 7 to 13 feet at mean low tide, which is an increase of several feet over the depths which prevailed previously.

It is not expected, however, that the increased depth will be maintained permanently until the north jetty is extended farther seaward, as provided for in the project for improvement.

An attempt was made in November, 1900, to remove the channel rock, referred to on page 4269 of the Annual Report of the Chief of Engineers for 1900, by surface blasting. Five charges, each of 400 pounds of nitrogelatin, were exploded on the highest portion of the rock, but soundings made afterwards showed no material increase in the depth of water over the rock. It is believed that it will be necessary to drill the rock before it can be successfully blasted.

Mr. William G. Carroll, inspector, has been in immediate charge of the work in progress at the mouth of the river during the past fiscal year.

During the past fiscal year the completed south jetty, which is about 2,700 feet in length, deteriorated slightly at its sea end, the crest of the 90 feet of the sea end having been beaten down by heavy seas, so that at present that portion of the crest of the jetty does not extend above mean low tide. This does not lessen the effectiveness of the jetty to any appreciable extent, however.

With the small balance available July 1, 1901, together with the $75,000 named in the appended money statement as the amount that can be profitably expended in fiscal year ending June 30, 1903, for works of improvement, it is estimated that the north jetty may be completed by extending it seaward for the distance of about 1,000 feet. This estimate is made, however, on the basis that the entire amount of $75,000 will be appropriated at one time.

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $25,705.33 |
| June 30, 1901, amount expended during fiscal year | 22,324.47 |
| July 1, 1901, balance unexpended | 3,380.86 |
| July 1, 1901, outstanding liabilities | 126.50 |
| July 1, 1901, balance available | 3,254.36 |
| Amount (estimated) required for completion of existing project | 75,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 75,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

### APPROPRIATIONS.

| Act of— | |
|---|---|
| June 14, 1880 | $10,000 |
| August 2, 1882 | 10,000 |
| July 5, 1884 | 10,000 |
| August 5, 1886 | 20,000 |
| August 11, 1888 | 25,000 |
| September 19, 1890 | 30,000 |
| July 13, 1892 | $25,000 |
| August 18, 1894 | 20,000 |
| June 3, 1896 | 20,000 |
| March 3, 1899 | 40,000 |
| Total | 210,000 |

*Abstract of contract in force during the fiscal year ending June 30, 1901, for constructing jetties, etc., at mouth of Coquille River, Oregon.*

| Contractor. | Date of contract. | Date of approval. | Date of beginning work. | Date of expiration. |
|---|---|---|---|---|
| John Kiernan | Aug. 15, 1899 | Sept. 6, 1899 | Oct. 21, 1899 | [a] Sept. 17, 1900 |

[a] Completed March 4, 1901.

The rates paid for materials furnished and placed in the work by the contractor were printed in the Annual Report of the Chief of Engineers for 1900, page 4270.

### COMMERCIAL STATISTICS.

The Coquille River is in the collection district of southern Oregon. Empire City, on Coos Bay, is the port of entry. The nearest light-house is at Rackliffe Rock, on the north side of the mouth of Coquille River.

The following commerce was carried by vessels across the bar at the mouth of the river during the calendar year 1900:

| Articles. | Tons. |
|---|---|
| RECEIPTS. | |
| General merchandise | 1,814 |
| Wool | 30 |
| Hay | 44 |
| Total | 1,888 |
| SHIPMENTS. | |
| Lumber and logs | 24,685 |
| Coal | 1,150 |
| SHIPMENTS—continued. | |
| Match wood | 1,904 |
| Broom handles | 821 |
| Salmon | 160 |
| Hides | 2 |
| Agricultural products | 32 |
| Miscellaneous | 85 |
| Total | 28,839 |

*List of vessels crossing bar at mouth of Coquille River, Oregon, during year ending December 31, 1900.*

| Name. | Character. | Length. | Breadth. | Depth of hold. | Draft when fully laden. | Net tonnage. | Number of times arrived. | Number of times departed. | Total number of times arrived and departed |
|---|---|---|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | | | | |
| Albion | Sail | 80.5 | 27 | 5 | 8 | 75 | 10 | 10 | 20 |
| Amethyst | do | 72.5 | 26 | 5.7 | 8 | 70 | 2 | 2 | 4 |
| Antelope | do | 89.5 | 28.5 | 7 | 9 | 117 | 4 | 4 | 8 |
| Argo | Steam | 117.5 | 21.8 | 9.6 | 10 | 209 | 3 | 3 | 6 |
| Barbara Hernster *a* | Sail | 102.3 | 29.7 | 8.3 | 9.5 | 140 | 1 | 1 | 2 |
| Bender Bros | do | 77.5 | 24.8 | 6.8 | 9 | 80 | 2 | 2 | 4 |
| Berwick | do | 82.6 | 27.4 | 7.1 | 9 | 95 | 1 | 1 | 2 |
| Bessie K. *a* | do | 84.5 | 26.2 | 7.6 | 9 | 93 | 2 | 2 | 4 |
| Confianza | do | 78 | 25.5 | 7 | 9 | 84 | 11 | 11 | 22 |
| Coquille | do | 92.9 | 29.5 | 6.4 | 8.5 | 97 | 8 | 8 | 16 |
| Corinthian | do | 81 | 25.6 | 6.8 | 9 | 89 | 1 | 1 | 2 |
| Del Norte | do | 82.6 | 27.4 | 7.1 | 9 | 95 | 2 | 2 | 4 |
| Five Brothers | do | 79 | 25.7 | 6.7 | 8.5 | 70 | 5 | 5 | 10 |
| Free Trade | do | 86.5 | 26.4 | 6.2 | 8 | 87 | 1 | 1 | 2 |
| Gem | do | 106.9 | 30 | 7 | 9 | 114 | 1 | 1 | 2 |
| Joseph and Henry | do | 84 | 27 | 6.6 | 8.5 | 91 | 11 | 10 | 21 |
| Lizzie Prien | do | 91.8 | 30.6 | 6.4 | 8 | 91 | 5 | 5 | 10 |
| Mandalay | Steam | 148 | 33.6 | 12 | 13 | 266 | 3 | 3 | 6 |
| Mary Bidwell | Sail | 75 | 21 | 5.5 | 7.5 | 62 | 1 | 1 | 2 |
| Mayflower | do | 80.5 | 26.5 | 6.2 | 8 | 86 | 9 | 8 | 17 |
| Mizpah | do | 70 | 22.9 | 7 | 8.5 | 41 | 1 | .......... | 1 |
| Parkersburg | do | 100 | 31 | 6.5 | 8.5 | 117 | 8 | 8 | 16 |
| Reliance | do | 69.5 | 24 | 6.5 | 8 | 61 | 1 | 1 | 2 |
| Rio Rey | do | 79 | 25.2 | 6 | 8 | 79 | 2 | 2 | 4 |
| Volante | do | 87 | 25.6 | 7.6 | 9 | 119 | 1 | 2 | 3 |
| Wing and Wing | do | 104 | 30 | 8.2 | 9.6 | 134 | 1 | 1 | 2 |
| Total | | | | | | | 97 | 95 | 192 |

*a* Auxiliary gasoline power.

## V V 2.

## IMPROVEMENT OF COQUILLE RIVER, OREGON, BETWEEN COQUILLE AND MYRTLE POINT.

Information concerning the project for obtaining a channel 4 feet deep and 60 feet wide, for small steamboats and launches, in the 13 miles of the Coquille River between Coquille and Myrtle Point, and the results of operations in former years, are cited in the summary of this report.

The operations during fiscal year ending June 30, 1901, were carried on by hired labor and with Government plant, were in continuation of the operations in progress at the close of the last fiscal year (reported in the Annual Report of the Chief of Engineers for 1900, page 4271), and were as follows, attention being invited to the project for improvement and maps following page 3348 of the Annual Report of the Chief of Engineers for 1895 for information concerning the location of the shoals, etc., mentioned below:

*Shoal No. 7.*—The least low-water depth found on this shoal was 1½ feet. The Government dredge scow dredged 1,510 cubic yards of material from this shoal and removed 67 large snags and 201 small snags from it, resulting in obtaining a low-water channel 50 feet wide, 4 feet deep, and extending for the distance of 330 feet through the shoal.

It was found that a new shoal had formed a short distance below shoal No. 7. The least low-water depth found on this new shoal was about 2 feet. The Government dredge scow dredged 1,766 cubic yards of material from this shoal and removed 6 large snags and 60 small snags from it, resulting in a dredged channel 50 feet wide, 4 feet deep (at low water), and extending for the distance of 430 feet through the shoal.

*Shoal No. 6.*—The least low-water depth found on this shoal was 1½ feet. The Government dredge scow dredged 3,268 cubic yards of material from this shoal and removed 2 large snags and 6 small snags from it, resulting in obtaining a low-water channel 50 feet wide, 4 feet deep, and extending for the distance of 840 feet through the shoal.

*Shoal No. 5.*—The least low-water depth found on this shoal was 1 foot. The Government dredge scow dredged 3,340 cubic yards of material from this shoal and removed 89 large snags and 146 small snags from it, resulting in obtaining a low-water channel 60 feet wide, 4 feet deep, and extending for the distance of 440 feet through the shoal.

*Between Shoals Nos. 4 and 5.*—At places between these two shoals the channel was found to have a low-water depth of only about 2 feet. The Government dredge scow dredged 3,206 cubic yards of material and removed 74 large snags and 53 small snags between these two shoals, resulting in obtaining a low-water channel 50 feet wide, 4 feet deep, and extending for the distance of 1,370 feet.

*Between Shoals Nos. 3 and 4.*—As stated on page 4272 of the Annual Report of the Chief of Engineers for fiscal year ending June 30, 1900, a low-water channel 36 feet wide and 4 feet deep was dredged in June, 1900, through a shoal at the lower end of the two rows of pile dikes which confine the channel from Roberts Landing up to Rackliffs Landing. During the past fiscal year the width of this dredged channel was increased from 36 feet to 50 feet by the Government dredge scow, 5,068 cubic yards of material being dredged and 43 large snags and 73 small snags being removed. This resulted in obtaining a channel 50 feet wide and 4 feet deep at low water, extending throughout the length of the shoal, about 1,300 feet.

*Shoal No. 3.*—The least low-water depth found on this shoal was 1½ feet. The Government dredge scow dredged 2,976 cubic yards of material from this shoal and removed from it 23 large snags and 40 small snags, obtaining a low-water channel 50 feet wide, 4 feet deep, and extending through the shoal for the distance of 600 feet.

The material dredged from the above-named shoals consisted of sand and fine gravel, except at Shoal No. 3, where coarse gravel and clay were encountered. The average cost for the dredging, including the removal of the snags, was a fraction over 6 cents per cubic yard.

*Roberts Landing to Rackliffs Landing.*—In fiscal year ending June 30, 1898, the channel of the river in the five-eighths of a mile between these two points was confined between two rows of pile dikes 60 feet apart (as shown by photographs following page 4272 of the Annual Report of the Chief of Engineers for 1900). During the past fiscal year six cross dikes, the aggregate length of which was 585 feet, were constructed, connecting the two rows of pile dikes built in 1898 to the banks of the river to further aid in confining the channel between the two rows of pile dikes built in 1898.

The operations for the year were suspended, on account of the small balance available, October 25, 1900, at which time the several small steamboats and launches plying the stream experienced but little difficulty in reaching Rackliffs Landing, about 11½ miles above Coquille. On account of the limited amount available for operations, no work was done during the past fiscal year above Rackliffs Landing.

Mr. William G. Carroll, inspector, was in immediate charge of the operations in progress during the past year.

A new stern-wheel steamboat, the *Welcome*, 56.2 feet long, 13.5 feet wide, net tonnage 21, drawing but 1.5 feet of water when loaded, and built especially for navigating the shallow portions of the stream between Coquille and Myrtle Point, was completed and placed in commission during the past fiscal year, and on account of its light draft it has been found to be very satisfactory for service in this river.

Another stern-wheel steamboat 77 feet long, 16 feet wide, draft when fully loaded about 14 inches, is nearing completion at this time.

This boat is being built especially for this stream also. The draft of these new boats is only about one-half the draft of the boats which have attempted to navigate the stream between Coquille and Myrtle Point in former years.

No deterioration of the improvement thus far made occurred in the fiscal year ending June 30, 1901, excepting that a number of snags have been brought into the stream by freshets. It is estimated that these snags and other snags which are expected to lodge in the channel between June 30, 1901, and June 30, 1903, may be removed for about $3,000.

It appears that the bed of the stream is being filled up each year in the 3 or 4 miles immediately below Myrtle Point by sediment brought down during freshets, and it is considered impracticable to obtain and maintain the projected channel 60 feet wide and 4 feet deep at mean low water throughout the distance of 13 miles between Coquille and Myrtle Point except at an expense not warranted by the limited amount of commerce of the region. On this account, together with the recent introduction of very light-draft boats to take the place of the boats of greater draft which formerly attempted to navigate the stream, it is believed that the project for improvement between Coquille and Myrtle Point requires revision, to better meet the changed conditions and requirements. A modified plan of improvement is under consideration, and report on the subject will be submitted at an early date.

In the meantime it is submitted that in any event it is considered that it will be necessary to remove the snags which annually come into the stream and dredge some of the worst shoals, in order to maintain a channel for the new light-draft boats. It is estimated that this will cost $1,500 per annum. Accordingly $3,000 is named in the appended money statement as the amount, in addition to the small balance available July 1, 1901, that can be profitably expended for maintenance of improvement in fiscal year ending June 30, 1903.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $3,855.50 |
| June 30, 1901, amount expended during fiscal year | 3,820.68 |
| July 1, 1901, balance unexpended | 34.82 |
| July 1, 1901, outstanding liabilities | 24.55 |
| July 1, 1901, balance available | 10.27 |
| Amount (estimated) required for completion of existing project | 19,980.77 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of improvement, in addition to the balance unexpended July 1, 1901 | 3,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | |

APPROPRIATIONS.

Act of—

| | |
|---|---|
| July 13, 1892 | $5,000 |
| August 18, 1894 | 5,000 |
| June 3, 1896 | 12,000 |
| March 3, 1899 | 9,000 |
| Total | 31,000 |

COMMERCIAL STATISTICS.

The traffic on the Coquille River between Coquille and Myrtle Point during the year ending December 31, 1900, was handled by the steamers *Reta* and *Welcome*, the freight carried being as follows:

| Articles. | Up. | Down. | Articles. | Up. | Down. |
|---|---|---|---|---|---|
| | *Tons.* | *Tons.* | | *Tons.* | *Tons.* |
| General merchandise, machinery, etc | 1,314 | 8 | Oats and barley | 105 | 257 |
| Butter and cheese | 12 | 77 | Hay | 81 | 560 |
| Bacon | 5 | 78 | Milk | 7 | 711 |
| Live hogs | | 65 | | | |
| Apples and potatoes | 85 | 418 | Total | 1,609 | 2,174 |

Passengers, up and down, 8,459.

*List of boats plying Coquille River, Oregon, between Coquille and Myrtle Point, during year ending December 31, 1900.*

| Name. | Character. | Length. | Breadth. | Depth. | Draft, loaded. | Net tonnage. |
|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | |
| Reta | Screw propeller | 53 | 11.8 | 4.9 | 3.5 | 18 |
| Welcome | Stern-wheel steamboat. | 56.2 | 13.5 | 2.8 | 1.5 | 21 |

## V V 3.

## IMPROVEMENT OF ENTRANCE TO COOS BAY AND HARBOR, OREGON.

Information concerning the present project for obtaining and maintaining a channel 20 feet deep at low tide running straight out to sea through the bar in the Pacific Ocean at the entrance to Coos Bay, by means of rubblestone jetties, and the results of operations in former years are cited in the summary of this report.

The present project contemplates confining the entrance to the bay between two high-tide rubblestone jetties, but the projected depth has been practically obtained by means of the 9,600-foot north jetty alone. The north jetty is considered to have been completed in November, 1897. Therefore the operations under the one appropriation made since then (appropriation of $150,000 of March 3, 1899) have consisted of maintaining the improvement by placing additional rubblestone in the north jetty, principally at and near its sea end, to compensate for settlement caused by heavy seas since the jetty was completed in 1897.

During the fiscal year ending June 30, 1901, the operations consisted principally of continuing the work of placing additional rubblestone in the north jetty, to compensate for settlement caused by heavy seas. This work was carried on under contract with Wakefield & Jacobsen, of Portland, Oreg., dated August 15, 1899. (Operations under this contract were commenced in September, 1899, and for information concerning the general requirements of the contract and the result of operations under it from September, 1899, to June 30, 1900, attention is invited to the Annual Report of the Chief of Engineers for 1900, p. 4274.) The work required under this contract was completed on March 15, 1901. Between July 1, 1900, and March 15, 1901, the contractors furnished and placed the following-named quantities of materials in the portions of the work named:

*North jetty tramway.*

| | | |
|---|---|---|
| Piles, 3,474 linear feet, at 15 cents | $521.10 | |
| Lumber, 22,110 feet B. M., at $14 | 309.54 | |
| Rails, 1.44 tons, at $55 | 79.20 | |
| Driftbolts, 1,974 pounds, at 5½ cents | 108.57 | |
| Railroad spikes, new, 1,213 pounds, at 5 cents | 60.65 | |
| Ship spikes, 918 pounds, at 5 cents | 45.90 | |
| | | $1,124.96 |

*North jetty.*

| | | |
|---|---|---|
| Rubblestone, 104,130.2 tons, at 57½ cents | | 59,874.86 |
| Total gross amount earned by contractors | | 60,999.82 |
| Less deductions for rent of Government plant and for Government materials sold contractors | $3,830.46 | |
| Less value of Government plant not returned by contractors upon completion of contract | 128.45 | |
| | | 3,958.91 |
| Total net amount earned by contractors in fiscal year ending June 30, 1901 | | 57,040.91 |

The placing of the above-named materials resulted in rebuilding the 80 feet of the north jetty tramway from bent No. 644 to bent No. 648, both inclusive, so that rubblestone could be dumped from the tramway to the jetty below at all points throughout its length of about 2 miles, and in raising the crest of the rubblestone mound composing the jetty to its projected height at practically all points throughout its length. The rubblestone furnished and placed by the contractors during the past fiscal year was placed at and near the sea end of the jetty, with the exception of about 5,000 tons which were placed in the jetty at various other points where slight settlement had occurred. In August, 1900, the crest of the jetty was up to its projected height at practically all points throughout its entire length. Since that time storms have carried away about 600 feet of the tramway at its sea end, and beaten the jetty itself down so that for several hundred feet at its sea end its crest is 10 or 12 feet below low tide level. However, this settlement of the few hundred feet of the sea end of the jetty has not thus far lessened the effectiveness of the jetty to any appreciable extent.

The greater portion of the rubblestone placed in the jetty by the contractors during the past fiscal year was taken from the Government quarry on the North Fork of Coos River, about 22 miles from the shore end of the jetty. As in former years, the stone was loaded on scows at the quarry and towed to the wharf at the shore end of the jetty, where it was transferred by derrick to dump cars. The loaded cars were then hauled out on the tramway to the proper point over the jetty by small locomotives and the stone dumped in place on the jetty below. The weight of the rubblestone placed in the jetty by the contractors during the past fiscal year was ascertained by track scales.

The number of men employed each day by the contractors at the quarry and at the jetty from July 1, 1900, to March 15, 1901, on which latter date the contract was completed, varied from 75 to 100.

During a few days in December, 1900, the bar channel shoaled so that at one time there was but 16 feet of water in it at low tide, but immediately afterwards the least depth that could be found in the channel at low tide was 25 feet. The average depth that has prevailed in the bar channel during the past fiscal year has been about 20 feet at low tide, as called for by the project.

The severe storms of the early part of the winter of 1900 caused considerable erosion along the shore of the bay in the vicinity of the shore end of the jetty, which threatened to undermine the piles of the jetty tramway near the wharf. This erosion was stopped by protecting the shore with mattresses of brush fascines and poles, weighted with small stone, the materials for the mattresses being obtained by hired labor, and the stone being purchased of the contractors for the jetty work at the contract price, 57½ cents per ton. About 80 cords of brush fascines and 500 tons of rubblestone were so used in protecting the shore.

The small quantity of the Holland grass (*Arundo arenaria*) planted as an experiment in past years, with the view of holding the shifting sands of the north spit, thrived satisfactorily during the past year.

Photographs of the jetty, taken in June, 1900, and a map of the latest survey of the entrance to the bay, made in August, 1899, appear opposite page 4278 of the Annual Report of the Chief of Engineers for 1900.

Mr. Morton L. Tower, inspector, has been in immediate charge of operations at the entrance to the bay during the past fiscal year.

As above stated, the north jetty tramway and the north jetty itself have deteriorated at the sea end. Furthermore, older portions of the tramway, near its shore end, have deteriorated, through natural decay and the ravages of the teredo, requiring somewhat extensive repairs to be made before more stone can be placed in the 500 or 600 feet of the sea end of the jetty. The wharf at the shore end of the jetty should also be rebuilt, and the Government plant, which has been in use a number of years, requires extensive repairs. The following is an estimate of the cost of restoring the jetty so that its crest will be up to the projected height at all points throughout its length of 9,600 feet:

| | |
|---|---|
| Repairs to north jetty tramway | $7,338.94 |
| Rebuilding wharf at shore end of jetty | 2,633.76 |
| Repairs to plant | 16,000.00 |
| Rubble stone for jetty (153,216 tons, at 70 cents per ton in place in jetty) | 107,251.20 |
| Engineering, superintendence, inspection, etc | 20,000.00 |
| | 153,223.90 |
| Deduct balance available July 1, 1901 | 10,253.26 |
| Balance | 142,970.64 |

Accordingly, the sum of $142,970.64 is named in the appended money statement as the amount, in addition to the balance available July 1, 1901, that can be profitably expended for maintenance of improvement, in fiscal year ending June 30, 1903. It seems proper to add in this connection that a less amount than this could not be economically or advantageously applied at this time, for the reason that the somewhat extensive repairs required to be made to the tramway, plant, etc., before additional rubble stone can be placed in the sea end of the jetty should not be undertaken unless there is also available at the same time sufficient funds with which to proceed immediately with the work of placing the necessary additional stone in the jetty. It also seems proper to add that, judging from past experience at Coos Bay, the jetty in its present condition may possibly continue to maintain the projected depth in the bar channel. However, in view of the doubt on this point, the locality is considered to be worthy of improvement at this time to the extent of restoring the works of improvement at the estimated cost named above.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $96,016.99 |
| November 10, 1900, refundment of overpayment | .56 |
| | 96,017.55 |
| June 30, 1901, amount expended during fiscal year | 85,417.56 |
| July 1, 1901, balance unexpended | 10,599.99 |
| July 1, 1901, outstanding liabilities | 346.73 |
| July 1, 1901, balance available | 10,253.26 |
| Amount (estimated) required for completion of existing project | 1,791,412.20 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of improvement, in addition to the balance unexpended July 1, 1901 | 142,970.64 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | |

APPROPRIATIONS.

| Act of— | |
|---|---|
| March 3, 1879 | $40,000.00 |
| March 3, 1881 | 30,000.00 |
| August 2, 1882 | 30,000.00 |
| July 5, 1884 | 30,000.00 |
| August 5, 1886 | 33,750.00 |
| August 11, 1888 | 50,000.00 |
| September 19, 1890 | 125,000.00 |
| July 13, 1892 | 210,000.00 |
| August 18, 1894 | $95,000.00 |
| June 3, 1896 | 95,000.00 |
| March 3, 1899 | 150,000.00 |
| November 10, 1900, refundment of overpayment [1] | .56 |
| Total | 888,750.56 |

*Abstract of contract in force during the fiscal year ending June 30, 1901, for constructing north jetty at entrance to Coos Bay, Oregon.*

| Contractor. | Date of contract. | Date of approval. | Date of beginning work. | Date of expiration. |
|---|---|---|---|---|
| Wakefield & Jacobsen | Aug. 15, 1899 | Sept. 1, 1899 | Oct. 6, 1899 | Sept. 2, 1901 |

This contract was completed March 15, 1901.

The rates paid for materials furnished and placed in the work by the contractors were printed in the Annual Report of the Chief of Engineers for 1900 (p. 4279).

COMMERCIAL STATISTICS.

Coos Bay is in the collection district of southern Oregon. Empire City, on Coos Bay, is the port of entry. The nearest light-house is at Cape Arago, on the south side and west of the entrance to the bay.

The commerce carried by vessels across the bar at the entrance to the bay during the calendar year 1900 follows.

---

[1] Overpayment of 56 cents made on voucher No. 5, for June, 1900, refunded November 10, 1900.

| Articles. | Tons. | Articles. | Tons. |
|---|---|---|---|
| RECEIPTS. | | SHIPMENTS—continued. | |
| Miscellaneous freight | 12,333 | Apples and potatoes | 1,268 |
| | | Butter and cheese | 553 |
| SHIPMENTS. | | Hides and leather | 94 |
| | | Cattle and hogs | 273 |
| Coal | 39,602 | Fish | 393 |
| Lumber (26,591,527 feet B. M.) | 39,886 | Woolen goods | 138 |
| Laths | 1,450 | Miscellaneous | 2,629 |
| Match wood | 979 | | |
| Piles, poles, and spars | 4,696 | Total shipments | 91,961 |

Number of passengers arrived by sea, 1,830; departed by sea, 1,708.

*List of vessels crossing the bar at the entrance to Coos Bay, Oregon, during the year ending December 31, 1900.*

| Name. | Character. | Length. | Breadth. | Depth of hold. | Draft fully laden. | Net tonnage. | Number of times arrived. | Number of times departed. | Total number of times arrived and departed. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | | | | |
| Alice Blanchard | Steam | 146.6 | 28.8 | 18 | 17 | 396 | 6 | 7 | 13 |
| Alliance | do | 164.4 | 35.6 | 12 | 16 | 431 | 5 | 5 | 10 |
| Arcata | do | 180 | 26.2 | 8.6 | 13.5 | 415 | 38 | 38 | 76 |
| Columbia | do | 102 | 24.3 | 11.3 | 14 | 70 | 2 | 2 | 4 |
| Coquille River | do | 146.2 | 34.2 | 12.4 | 15 | 274 | 1 | 1 | 2 |
| Del Norte | do | 158 | 32.2 | 12.5 | 14 | 279 | 29 | 29 | 58 |
| Empire | do | 170 | 32.7 | 20.1 | 17 | 525 | 31 | 31 | 62 |
| Fearless[a] | do | | | | | | 1 | 1 | 2 |
| Gen. H. G. Wright | do | 65 | 15 | 7.6 | 7 | 44 | 4 | 4 | 8 |
| Homer | do | 146 | 33.8 | 17 | 14 | 331 | 5 | 5 | 10 |
| Hunter | do | 95 | 21.7 | 10.4 | 11 | 52 | 21 | 21 | 42 |
| Maggie | do | 67 | 20 | 6.5 | 9 | 58 | 2 | 2 | 4 |
| Mandalay | do | 142 | 33 | 12 | 14 | 267 | 1 | 2 | 3 |
| Manzanita | do | 152 | 26 | 11.5 | 12 | 450 | 3 | 3 | 6 |
| Rival | do | 139 | 32 | 10.2 | 13 | 203 | 2 | 2 | 4 |
| Robarts | do | 75.5 | 18.2 | 6.5 | 9 | 24 | 7 | 7 | 14 |
| Ruth | do | 151 | 33.5 | 10.7 | 14 | 237 | 1 | 1 | 2 |
| Signal | do | 150 | 34.4 | 13.8 | 16 | 392 | 2 | 2 | 4 |
| South Coast | do | 131.5 | 32.2 | 10.5 | 14 | 225 | 2 | 2 | 4 |
| Sunol | do | 135 | 27.5 | 7 | 13 | 246 | 1 | 1 | 2 |
| Triumph | do | 64 | 19.7 | 8 | 10 | 27 | 1 | 1 | 2 |
| Abbie | Sail | 98.5 | 29.5 | 8.3 | 11 | 138 | 4 | 4 | 8 |
| Antelope | do | 89.5 | 28.5 | 7 | 10 | 117 | 2 | 2 | 4 |
| Chas. E. Falk | do | 142.8 | 34 | 9 | 12 | 245 | 2 | 2 | 4 |
| Churchill | do | 178 | 38 | 15 | 18 | 600 | | 1 | 1 |
| Daisy Rowe | do | 94.5 | 29 | 7.5 | 11 | 116 | 8 | 8 | 16 |
| Emma Utter | do | 134.7 | 33.1 | 10.1 | 12 | 265 | 5 | 5 | 10 |
| Forest Home | do | 173 | 40 | 15 | 18 | 682 | | 1 | 1 |
| Free Trade | do | 86.5 | 26.4 | 6.2 | 9 | 87 | 2 | 2 | 4 |
| Gardiner City | do | 169 | 39 | 12 | 17 | 451 | 2 | 2 | 4 |
| Genl. Banning | do | 112.5 | 30 | 8.4 | 10 | 168 | 3 | 3 | 6 |
| Gem | do | 106.9 | 30 | 7 | 11 | 114 | 3 | 2 | 5 |
| Glen | do | 106.6 | 29 | 8.3 | 10 | 121 | 2 | 1 | 3 |
| Gotoma | do | 119 | 32.6 | 8.6 | 11 | 188 | 11 | 10 | 21 |
| Guide | do | 126 | 26.7 | 7.4 | 9 | 137 | 1 | 1 | 2 |
| I. T. Monitor | do | 127 | 28 | 9 | 12 | 223 | 1 | 1 | 2 |
| Ivy | do | 102.5 | 28.8 | 8.8 | 11 | 135 | 2 | 2 | 4 |
| James A. Garfield | do | 140 | 37.5 | 10.2 | 14 | 300 | 6 | 6 | 12 |
| Jennie Thelin | do | 91 | 29.5 | 8.2 | 10 | 138 | 2 | 2 | 4 |
| Jennie Wand | do | 124 | 32.8 | 9 | 12 | 163 | 1 | 1 | 2 |
| John F. Miller | do | 107 | 30.6 | 9 | 12 | 170 | 1 | | 1 |
| Jos. L. Eviston | do | 190 | 40 | 15 | 18 | 662 | | 1 | 1 |
| Laura Pike | do | 96 | 29 | 7.7 | 10 | 139 | 1 | 1 | 2 |
| Letitia | do | 112 | 28.5 | 10.4 | 13 | 233 | 1 | 1 | 2 |
| Mary E. Russ | do | 115.5 | 32 | 9.6 | 13 | 223 | 2 | 2 | 4 |
| Maxim | do | 92 | 27 | 7 | 10 | 111 | 3 | 3 | 6 |
| Melanchthon | do | 133 | 30.5 | 10.9 | 16 | 283 | 4 | 4 | 8 |
| Neptune | do | | | | | | 1 | 1 | 2 |
| Repeat | do | 148.9 | 34.4 | 12 | 14 | 410 | 1 | 1 | 2 |
| Santa Ana | do | | | | | 464 | | 1 | 1 |
| Viking | do | 189.6 | 40.1 | 18.5 | 11 | 139 | 3 | 2 | 5 |
| Volante | do | 87 | 25.6 | 7.6 | 11 | 119 | 1 | 1 | 2 |
| Volunteer | do | 128.4 | 38.9 | 12 | 17 | 542 | 3 | 3 | 6 |
| Webfoot | do | 146.5 | 31 | 10.8 | 13 | 343 | 2 | 2 | 4 |
| Western Home | do | 96.5 | 29 | 7.9 | 10 | 128 | 10 | 10 | 20 |
| Barbara Hernster | Gas | 102.3 | 29.7 | 8.3 | 9.5 | 140 | 1 | 1 | 2 |
| Monterey | do | 96.5 | 28 | 7.5 | 10 | 119 | 10 | 11 | 21 |
| Total | | | | | | | 266 | 268 | 534 |

[a] Chilean whaling vessel.

## V V 4.

### IMPROVEMENT OF COOS BAY, OREGON (DREDGING).

The project (completed) for dredging channels through shoals and removing other obstructions to navigation in Coos Bay, and the results of operations under the project, were printed in the Annual Reports of the Chief of Engineers for 1899 (pp. 3205–3207) and 1900 (pp. 642–644 and 4280–4283).

The project having been completed in fiscal year ending June 30, 1900, there were no operations during the past fiscal year. The unexpended funds in hand ($64.84) were returned to the Treasury July 18, 1900, and this is the final report for this work.

No deterioration of the improvement occurred during fiscal year ending June 30, 1901, excepting that slight shoaling has been noticed in the channel dredged in October–December, 1899, at the mouth of Coos River. The estimate for maintenance of the improvement of Coos River, Oregon, during the fiscal year ending June 30, 1901, includes the estimated amount required to restore this dredged channel.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | [1]$70.72 |
| July 18, 1900, balance in Treasury United States | [2]70.72 |

APPROPRIATIONS.

| | |
|---|---|
| Act of— | |
| August 18, 1894 | $13,000.00 |
| June 3, 1896 | 14,390.00 |
| February 2, 1900, refundment of overpayment | 9.75 |
| Total | 27,399.75 |

## V V 5.

### IMPROVEMENT OF COOS RIVER, OREGON.

The project for obtaining a channel 50 feet wide, free of obstructing bowlders and snags, from the mouth of the river in Coos Bay to the head of tide on the North and South forks, and the results of operations in former years, are mentioned in the Annual Report of the Chief of Engineers for 1900 (pp. 644–645 and 4283–4284).

The amount expended in fiscal year ending June 30, 1901, was for placing a small quantity of lumber and rubblestone in a deflecting dike near the mouth of the river.

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[1] Includes $64.84 in hand July 1, 1900.

[2] Includes $64.84 returned to Treasury July 18, 1900.

The channel for light-draft steamboats, as improved in past years, deteriorated somewhat during the past fiscal year, due to snags, logs, etc., being brought into the stream by freshets. The channel dredged at the mouth of the river in October-December, 1899, also shoaled slightly. It is estimated that in addition to the small balance available July 1, 1901, $1,500 will be required to restore the channel by removing snags, logs, etc., and dredging the bar at the mouth of the river. It is also estimated that the sum of $1,500 will be required to remove snags, logs, etc., which may be brought into the stream between the present time and June 30, 1903. Accordingly the sum of $3,000 is named in the appended money statement as the amount that can be profitably expended for maintenance of improvement in fiscal year ending June 30, 1903.

## *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $142.08 |
| June 30, 1901, amount expended during fiscal year | 47.25 |
| July 1, 1901, balance unexpended | 94.83 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of improvement, in addition to the balance unexpended July 1, 1901<br>Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | $3,000.00 |

### APPROPRIATIONS.

| Act of— | |
|---|---|
| June 3, 1896 | $5,000 |
| March 3, 1899 | 3,000 |
| Total | 8,000 |

### COMMERCIAL STATISTICS.

The traffic carried on Coos River during the year ending December 31, 1900, was as follows:

| Articles. | Tons. | Articles. | Tons. |
|---|---|---|---|
| DOWN. | | DOWN—continued. | |
| Butter | 204 | Milk | 11,650 |
| Cheese | 85 | Stone *a* | 170,400 |
| Potatoes | 1,350 | Logs | 39,271 |
| Beef | 157 | Miscellaneous freight | 500 |
| Hay | 500 | | |
| Fruit | 603 | UP. | |
| Hides | 20 | | |
| Hogs | 272 | General merchandise, loggers' supplies, tools, etc | 3,565 |
| Honey | 1 | | |
| Vegetables | 321 | | |
| Salmon | 326 | Total | 229,225 |

*a* Stone for Government jetty at entrance to Coos Bay, Oregon.

Passengers carried on the river by the boats, 9,850.

The traffic on Coos River during the year ending December 31, 1900, was handled principally by the following-named steam craft:

| Name. | Character. | Length. | Breadth. | Depth. | Draft loaded. | Net tonnage. |
|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | |
| Alert | Stern wheel | 69 | 14 | 4 | 3 | 58 |
| Alma | Screw propeller | 50 | 12 | 3 | 2 | 9 |
| Blanco | do | 61 | 16 | 5 | 5 | 18 |
| Comet | do | 82 | 17 | 7 | 7 | 47 |
| Coos River | do | 44 | 12 | 5 | 4 | 8 |
| Yarrow | do | 63 | 15 | 5 | 6 | 31 |

In addition to the above-named craft there are several gasoline boats and launches in the stream owned and operated by farmers living in the valley. Owing to the formation of the country, transportation other than by water is at present impracticable. The stream is therefore used as a highway for transportating practically all the commerce and passengers of the region.

## V V 6.

## IMPROVEMENT OF MOUTH OF SIUSLAW RIVER, OREGON.

Information concerning the project for the construction of two high-tide rubblestone jetties at the mouth of Siuslaw River, in the Pacific Ocean, to prevent the channel at the mouth of the stream from shifting up and down the coast, and to maintain a permanent channel 8 feet deep at low tide (equivalent to 13 to 14 feet at high tide) through the bar in the ocean opposite the mouth of the stream, and the result of operations under the project for improvement in former years are cited in the summary of this report.

During the fiscal year ending June 30, 1901, the work of extending the north jetty seaward was continued under contract with Hale & Smith, of Portland, Oreg., dated August 15, 1899. (Operations under this contract were commenced in October, 1899, and for information concerning the general requirements of the contract and the result of operations under it from October, 1899, to June 30, 1900, attention is invited to the Annual Report of the Chief of Engineers for 1900, pp. 4286–4288.)

The work required under this contract was completed on November 30, 1900. Between July 1 and November 30, 1900, the contractors furnished and placed the following-named quantities of materials in the portions of the work named:

*North jetty tramway.*

| | | |
|---|---|---|
| Piles, 1,579 linear feet, at 12 cents | $189.48 | |
| Lumber, 12,144 feet B. M., at $12 | 145.72 | |
| Rails, 20.44 tons, at $50 | 1,022.00 | |
| Driftbolts, 441 pounds, at 5 cents | 22.05 | |
| Railroad spikes, 1,633 pounds, at 5 cents | 81.65 | |
| Ship spikes, 472 pounds, at 5 cents | 23.60 | |
| Fish plates, 268 plates, at 35 cents per plate | 93.80 | |
| Bolts and nuts for fish plates, 243 pounds, at 5 cents | 12.15 | |
| | | $1,590.45 |

*North jetty.*

| | | |
|---|---|---|
| Brush mattresses, 120.67 cubic yards, at 90 cents | $108.60 | |
| Rubblestone, 21,865.66 tons, at 65 cents | 14,212.68 | $14,321.28 |
| Gross amount earned by contractors | | 15,911.73 |
| Less deductions for rent of Government plant, 5 months, at $100 per month | 500.00 | |
| Less deduction made for value of Government plant which contractors failed to return upon completion of the contract | 17.86 | |
| Less deduction made in accordance with the terms of supplementary contract dated February 25, 1901 | 625.00 | 1,142.86 |
| Net amount paid contractors for materials furnished and placed during the fiscal year | | 14,768.87 |

The placing of the above-named materials resulted in extending the north jetty tramway from bent No. 271 to bent No. 276, inclusive, or 90 feet (the distance between bents being 15 feet), in raising the crest of the north jetty up to its completed height from tramway bent No. 260 to No. 270, in completing the jetty entire from tramway bent No. 270 to bent No. 273, and in partially enrocking the line of the jetty from tramway bent No. 273 to a point a short distance seaward of the sea end bent (No. 276). The projected length of the north jetty, including the tramway approach at the shore end, 3,000 feet long, is 7,500 feet. Up to June 30, 1901, the north jetty, including the tramway approach, had been completed for the distance of about 4,090 feet (counting tramway bent No. 273 as the point to which the jetty has been fully completed).

Between tramway bents 270 and 272 a foundation of small stone was placed, and between bents 272 and 276 center mattresses of brush were placed as a foundation for the jetty.

The stone placed in the north jetty during the past year was taken by the contractors from the Point Terrace quarry, now owned by the United States, about 16 miles up the river from the wharf. The stone was loaded on scows at the quarry and towed to the wharf at the shore end of the jetty, where it was transferred by derrick to dump cars. The loaded cars were then hauled out on the tramway to the proper point over the jetty by a small locomotive and the stone dumped in place in the jetty below. During the night of October 14, 1900, a landslide occurred in the portion of the Point Terrace quarry that was being used by the contractors. This slide filled that portion of the quarry with a mass of débris extending from the bank of the river (which latter the quarry faces) up to a point 60 or 70 feet high on the face of the quarry. The contractors abandoned that portion of the quarry and quarried the remainder of the stone required under their contract from another portion of the quarry.

The contractors did not clear the quarry of the débris brought into it by the landslide. The sum of $625 was accordingly deducted from the final payment made under the contract. This deduction was made in accordance with the terms of a supplementary contract entered into with the contractors February 25, 1901, which was approved by the Chief of Engineers March 22, 1901.

As was the case during the previous year, the work during the past year of extending the tramway, sinking brush mattresses for foundation for the jetty, and extending the jetty seaward was very slow, owing to the great depths of water (50 to 55 feet) where the work was done. These depths are due to the fact that the curved portion of the jetty (see map following page 4290 of the annual report for 1900) has been extended westerly into the channel to a point where, with the channel in its northerly position, the bottom of the river immediately beyond the end of the jetty is scoured out. It is believed that the river bottom will continue to scour out in advance of the end of the jetty as the latter is extended seaward until the structure has been built sufficiently far seaward to force the channel at the mouth of the river to take up permanently a more southerly course.

The extension made to the jetty during the past fiscal year was too limited to have any appreciable effect on the channel at the mouth of the river, either in its position or its depth. The low-tide depth which prevailed in the bar channel during the year was about 7½ feet, which is equivalent to about 13 feet at high tide.

The authorization by the Secretary of War, in June, 1899, of the purchase of the Point Terrace stone quarry was mentioned on page 4289 of the last annual report. This quarry was purchased during the past year of the estate of Josephine R. Stiles, payment for same, $700, being made on December 13, 1900. The following is a description of the boundaries of the land:

Beginning at a rock marked "U. S." on the south bank of the Siuslaw River and distant 830 feet south 64 degrees west from the meander corner on section line between sections 8 and 17, 17.50 chains west of corner to sections 8, 9, 16, and 17, township 18 south of range 10 west, Willamette meridian, running thence from said beginning point south 15 degrees 35 minutes west 600 feet to a point; thence north 74 degrees 25 minutes west 1,520 feet to a point; thence north 15 degrees 35 minutes east 553 feet to a stake on the section line between sections 8 and 17; thence east along said section line 175 feet to the meander corner on the south bank of Siuslaw River; thence along the south bank of Siuslaw River south 74 degrees 25 minutes east 1,351 feet to the point of beginning; containing 20.75 acres of land, more or less, in Lane County, Oreg.

The authorization by the Secretary of War, in April, 1900, of the purchase of certain land needed in connection with the construction of the north jetty was also mentioned on page 4289 of the last annual report. This land was purchased during the past year of Charlotte J. Cox, payment for same, $500, being made on December 21, 1900. The following is a description of the boundaries of this land:

Beginning at a point at ordinary high-water line on the shore of the right bank of the Siuslaw River, which point is 170 feet west and 600 feet south of the United States Coast and Geodetic Survey station at Cannery Hill; thence north 1,317.13 feet to a point marked by an iron pipe; thence north 8 degrees 36 minutes east 1,133.38 feet to a point also marked by an iron pipe; thence north 10 degrees 22 minutes west 675.22 feet to a point marked by an iron pipe; thence north 504.41 feet to the north boundary of section 16, township 18 south, range 12 west, Willamette meridian, marked by an iron pipe, said last-mentioned point being 414.3 feet west of the corner to sections 9, 10, 15, and 16, township 18 south, range 12 west, Willamette meridian; thence west along the north boundary of said section 16 to the shore of the Pacific Ocean; thence along the shore of the Pacific Ocean and the mouth of the Siuslaw River, in a southerly and southeasterly direction, to the point of beginning, containing 4.09 acres, more or less, and being parts of lots 1, 2, and 3 of section 16, township 18 south, range 12 west, Willamette meridian, together with all the tide lands adjacent to the part in lot 3 of said section 16, township 18 south, range 12 west, Willamette meridian, being all situated in Lane County, Oreg.

Mr. George E. Bingham, inspector, was in immediate charge of the jetty construction during the past fiscal year.

It is estimated that with the small balance available July 1, 1901, together with the $60,000 named in the appended money statement as the amount in addition to the balance available July 1, 1901, that can be profitably expended for works of improvement in fiscal year ending June 30, 1903, the north jetty tramway and the north jetty may be extended seaward for the distance of 400 or 500 feet. It is also estimated that, in addition, the sum of $5,000 will be required for maintenance of improvement, the work of maintenance to consist of repairing portions of the north jetty tramway built in former years, which have deteriorated through natural decay (estimated cost of these repairs, $2,500), and to repairing damage to the tramway and placing additional rubblestone in the jetty to compensate for settlement, which damage and settlement, it is anticipated, will occur during the period July 1, 1901–June 30, 1903 ($2,500). The necessity for renewing portions of the north jetty tramway built in former years before the jetty can be extended farther seaward, and the great depth of water through which the jetty must necessarily be extended, at least for several hundred feet beyond its present sea end, are conditions which render it inadvisable to provide a sum less than $65,000 for this work at this time.

### *Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | $23,483.15 |
| June 30, 1901, amount expended during fiscal year | | 22,412.68 |
| July 1, 1901, balance unexpended | | 1,070.47 |
| July 1, 1901, outstanding liabilities | | 50.00 |
| July 1, 1901, balance available | | 1,020.47 |
| Amount (estimated) required for completion of existing project | | 548,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901: | | |
| For works of improvement | $60,000.00 | |
| For maintenance of improvement | 5,000.00 | |
| | | 65,000.00 |

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

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#### APPROPRIATIONS.

| Act of— | |
|---|---|
| September 19, 1890 | $50,000 |
| July 13, 1892 | 20,000 |
| August 18, 1894 | 25,000 |
| June 3, 1896 | 27,000 |
| March 3, 1899 | $30,000 |
| Total | 152,000 |

---

*Abstract of contract in force during the fiscal year ending June 30, 1901, for constructing jetty, etc., at mouth of Siuslaw River, Oregon.*

| Contractor. | Date of contract. | Date of approval. | Date of beginning work. | Date of expiration. |
|---|---|---|---|---|
| Hale & Smith | Aug. 15, 1899 | Sept. 1, 1899 | Oct. 21, 1899 | Sept. 2, 1900 |

This contract was completed November 30, 1900, the date of its expiration having been extended beyond September 2, 1900, to cover the time lost by the contractors on account of storms during the winter of 1899–1900.

The rates paid for materials furnished and placed in the work by the contractors were printed in the Annual Report of the Chief of Engineers for 1900 (p. 4290).

### COMMERCIAL STATISTICS.

The Siuslaw River is in the collection district of Yaquina, on Yaquina Bay, Oregon. The nearest light-house is at Heceta Head, 8½ miles north of the entrance to the river. The following-named commerce was carried by vessels across the bar at the mouth of the river during the calendar year 1900:

| Receipts. | Tons. | Shipments. | Tons. |
|---|---|---|---|
| General merchandise | 2,960 | Salmon | 395 |
| | | Lumber | 14,940 |
| Total | 2,960 | Miscellaneous | 380 |
| | | Total | 15,715 |

Number of passengers arrived by sea, 175; departed by sea, 173.

*List of merchant vessels crossing the bar at entrance to Siuslaw River, Oregon, during year ending December 31, 1900.*

| Name. | Character. | Length. | Breadth. | Depth of hold. | Draft fully laden. | Net tonnage. | Number of times arrived. | Number of times departed. | Total number times arrived and departed. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | | | | |
| Roberts | Steam | 75.6 | 18.2 | 6.5 | 9 | 24 | 25 | 25 | 60 |
| W. H. Harrison | do | 92 | 20.1 | 6.8 | 8 | 52 | 4 | 4 | 8 |
| Maggie | do | 67 | 20 | 6.5 | 9 | 58 | 2 | 3 | 5 |
| Bella | Sail | 121 | 32 | 6 | 11.5 | 147 | 7 | 6 | 13 |
| S. Danielson | do | 91.9 | 27.6 | 6.8 | 8.5 | 83 | 8 | 7 | 15 |
| R. J. Long | do | 87 | 27.4 | 5.7 | 8.6 | 85 | 5 | 4 | 9 |
| Lizzie Prien | do | 94.8 | 30.6 | 6.4 | 10 | 91 | 4 | 4 | 8 |
| Sacramento | do | 100.7 | 31.2 | 6.5 | 10 | 124 | 5 | 5 | 10 |
| Berwick | do | 82.6 | 27.4 | 7.1 | 8.7 | 95 | 4 | 4 | 8 |
| Del Norte | do | 82.6 | 27.4 | 7.1 | 8.7 | 95 | 3 | 3 | 6 |
| Total | | | | | | | 67 | 65 | 132 |

## V V 7.

## IMPROVEMENT OF YAQUINA BAY, OREGON.

The original project (completed) for obtaining a permanent channel having the least depth of 17 feet at high tide across the bar at the entrance to the bay, and the present project for removing a cluster of rocks on the side of the channel about 2,000 feet beyond the sea end of the south jetty, are mentioned in the summary of this report.

The operations during the fiscal year ending June 30, 1901, were confined to removing the most northerly of the three rocks shown on map opposite page 4292 of the Annual Report of the Chief of Engineers for 1900, as being beyond the sea end of the south jetty. This rock was found to consist of a pinnacle reef rising from the rocky bottom which underlies the entrance to the bay. It was about 23 feet long and 18 feet wide, and was composed of a gray argillaceous sandstone of fine grain, very hard and brittle, and similar in character to the underlying portions of the reefs which are exposed at low tide on the north headland of the bay. The least depth on the highest point of the most northerly rock in question, when work on it was commenced, in August, 1900, was 6 feet at mean lower low tide. In September, 1900, when operations were suspended on account of the approaching fall storms, this depth had been increased to 12½ feet at mean lower low tide.

The work of removing the rock during the past fiscal year was carried on by hired labor and with Government plant, U. S. S. *General H. G. Wright*, its crew of about six men, and a diver and a diver's attendant, being employed.

The first shipment of explosives was received at Yaquina Bay on August 7, 1900, and the second and last shipment was received on August 28, 1900. The work of removing the rock was practically commenced August 7, 1900, and was suspended September 16, 1900, the rough bar rendering further operations in the open sea impracticable.

The total quantities of explosives used were 1 ton of 75 per cent giant powder, and 2 tons of gelatine dynamite composed of 75 per cent nitrogelatine, 5 per cent nitrocellulose, 11 per cent sodium nitrate, 5 per cent magnesium carbonate, and 4 per cent wood flour. The explosives were purchased of the Giant Powder Company, of San Francisco. After various experiments in handling and exploding the the charges the following method was adopted: The explosives were taken out to the site of the rock by U. S. S. *General H. G. Wright*. The latter was securely moored nearly over the point to be blasted, and held in position by four anchors, and the diver was sent down to select a suitable place for the charge, such as a crevice or against a steep face of the rock. The explosives were passed down to the diver with a line, in 50-pound boxes, which were tied up in sacks containing also a sufficient amount of sand to overcome buoyancy. After the main charge was placed by the diver a priming charge, consisting of an electric exploder attached to several sticks of giant powder and connected with about 1,000 feet of double leading wire, was passed down and fastened by the diver to one of the boxes of giant powder. The diver was then hauled up and the steamer moved to a safe distance. Two men in a yawl fired the charge with a battery at a distance away of about 700 feet. The size of the charges varied from 150 to 700 pounds of giant powder and gelatine dynamite mixed. The average charge was about 500 pounds. In all, eighteeen blasts were made, on fourteen different days. At first the charges were placed in crevices and clefts and against steep faces, and good execution resulted, but the rock was soon crushed into a mass of débris, which remained more or less in place. Six or seven tons of this débris was loaded into a weighted stone box by the diver and taken away and dumped into deep water. The solid rock broken up in the operations during the year was about 70 cubic yards.

Mr. James S. Polhemus, assistant engineer, was in local charge of removing the rock.

It is estimated that the balance available July 1, 1901, will be sufficient to complete all proposed work at Yaquina Bay, by removing the remaining two rocks of the cluster during the summer of 1901, and that the sum of $2,000 will be required in addition to the balance available July 1, 1901, for maintenance of improvement during fiscal year ending June 30, 1903, this work of maintenance to consist of caring for the Government property and plant at Yaquina Bay.

No deterioration occurred during the past fiscal year.

At this time this harbor is not considered unworthy of improvement to the extent of completing the work of removing the cluster of rocks beyond the end of the south jetty with the funds now available.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $19,972.32 |
| June 30, 1901, amount expended during fiscal year | 7,067.83 |
| July 1, 1901, balance unexpended | 12,904.49 |
| July 1, 1901, outstanding liabilities | 170.00 |
| July 1, 1901, balance available | 12,734.49 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of improvement, in addition to the balance unexpended July 1, 1901<br>Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | 2,000.00 |

### APPROPRIATIONS.

| Act of— | | Act of— | |
|---|---|---|---|
| June 14, 1880 | $40,000 | September 19, 1890 | $165,000 |
| March 3, 1881 | 10,000 | July 13, 1892 | 85,000 |
| August 2, 1882 | 60,000 | August 18, 1894 | 50,000 |
| July 5, 1884 | 50,000 | June 3, 1896 | 25,000 |
| August 5, 1886 | 75,000 | | |
| August 11, 1888 | 150,000 | Total | 710,000 |

### COMMERCIAL STATISTICS.

Yaquina Bay is in the collection district of Yaquina. Yaquina is the port of entry. The nearest light-house is at Yaquina Head, 4½ miles north of the entrance.

The following commerce passed into and out of the bay on vessels during the calendar year 1900:

| Receipts. | Tons. | Shipments. | Tons. |
|---|---|---|---|
| General merchandise | 167 | Feed | 111 |
| | | Miscellaneous freight | 118 |
| Total | 167 | Flour | 295 |
| | | Total | 524 |

Number of passengers arrived by sea, 80; departed by sea, 55.

*List of merchant vessels crossing the bar at entrance to Yaquina Bay, Oregon, during the year ending December 31, 1900.*

| Name. | Character. | Length. | Breadth. | Depth of hold. | Draft fully laden. | Net tonnage. | Number of times arrived. | Number of times departed. | Total number times arrived and departed. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | | | | |
| Maggie | Steam | 67 | 20 | 6.5 | 9 | 58 | 1 | 1 | 2 |
| Robarts | do | 75.5 | 18.2 | 6.5 | 8.6 | 24 | 18 | 18 | 36 |
| Hunter | do | 95 | 21.7 | 10.4 | 11 | 52 | 3 | 3 | 6 |
| W. H. Harrison | do | 92 | 20.1 | 6.8 | 8 | 52 | 2 | 2 | 4 |
| Anita | Gasoline | 82 | 24.3 | 6.2 | 7 | 83 | 2 | 2 | 4 |
| Total | | | | | | | 26 | 26 | 52 |

## V V 8.

### YAQUINA BAY, OREGON, EXAMINATION.

The object of the examination and the results were printed in the Annual Report of the Chief of Engineers for 1900 (pp. 4293).

The expenditures during the past fiscal year were in settlement of liabilities incurred during the previous year.

In accordance with authority of the Chief of Engineers dated February 26, 1900, the unexpended balance of the appropriation of $5,000 made by the act of March 3, 1899, for the examination of the bay was returned to the Treasury July 18, 1900.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | [1]$310.40 |
| July 18, 1900, balance in Treasury United States | [2]310.40 |

NOTE.—The sum of 64 cents was expended by the Treasury Deparment in fiscal year ending June 30, 1901, in making settlement with the Southern Pacific Company, leaving the unexpended balance of the appropriation as of June 30, 1901, $309.76, all of which is in the Treasury of the United States.

APPROPRIATION.

| | |
|---|---|
| March 3, 1899 | $5,000 |

## V V 9.

### IMPROVEMENT OF TILLAMOOK BAY AND BAR, OREGON.

The project (now completed) for obtaining the least depth of 9 feet at mean high tide in a selected channel from Hobsonville, on Tillamook Bay, up to Tillamook City, on Hoquarten Slough, and the results of operations in former years are mentioned in the summary of this report.

The operations during the fiscal year ending June 30, 1901, were in continuation of the operations in progress at the close of the previous fiscal year, mentioned in the Annual Report of the Chief of Engineers for 1900 (pp. 4314–4318), and consisted of dredging shoals and constructing deflecting dikes in and along the selected channel leading from Hobsonville up to Tillamook City.

The work of widening by dredging the channel through the mud flat opposite Bay City, commenced with the Government dredge scow on June 16, 1900, was completed July 11, 1900. Between July 1 and 11, 1900, 1,735 cubic yards of material was dredged in widening this channel. The widths at bottom and top of this channel are 60 and 80 feet, respectively, and the channel is about 9 feet deep at mean high tide.

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[1] Includes $17.69 in hand July 1, 1900.

[2] Includes $17.69 returned to Treasury July 18, 1900.

Upon the completion of the work of widening the above-named channel the work of dredging a channel 675 feet long, 60 feet wide, and 10 feet deep at mean high tide through a shoal opposite the southern end of the dike built in former years across the head of Middle Channel was commenced and completed with the Government dredge scow.

On July 20, 1900, the dredge scow was moved up to Tillamook City, and between that time and Septemper 29, 1900, dredged several abrupt bends in Hoquarten Slough below Tillamook City, removing about 9,200 cubic yards of material.

The five spur dikes, 154, 255, 186, 147, and 63 feet long, on the south side of Hoquarten Slough, at Dry Stocking bar, the construction of which was in progress at the close of the last fiscal year, were completed during the past year by filling them with brush and rubblestone, furnished and placed in the dikes under a proposal received in response to a circular advertisement dated March 10, 1900. The quantities of materials placed in these five dikes during the year were 250.22 cords of brush fascines, 604.4 tons of rubblestone, 3,025 feet B. M., of lumber, 2,039.75 pounds of wire, and 123 pounds of spikes.

The two spur dikes, 356 and 313 feet long, on the south side of the selected channel, opposite the old mouth of Wilson River, under construction at the close of the last fiscal year, were completed during the past year by placing in them 200 cords of brush fascines, 736.9 tons of rubblestone, 11,409 feet B. M. of lumber, 548 pounds of wire, and 850 pounds of spikes.

The 581-foot spur dike under construction at the close of the last fiscal year, on the east side of the selected channel, opposite the southern end of the dike built in former years across the head of Middle Channel, was completed during the past year by placing in it 173 cords of brush fascines, 479.4 tons of rubblestone, 6,548 feet B. M. of lumber, 1,344 pounds of wire, and 362 pounds of spikes.

The work of extending the southern end of the dike built in former years across the head of Middle Channel, which was in progress at the close of the last fiscal year, was completed during the past year by placing in the 300-foot extension 85 cords of brush fascines, 247.5 tons of rubblestone, and 746 pounds of wire.

Minor repairs were also made during the past year by placing small quantities of brush fascines, rubblestone, etc., in the dike across Wilson River, built in 1895, in the dike extending north from Dicks Point, and in the shore protection at "revetment point," opposite Dry Stocking Island.

All the brush fascines, rubblestone, lumber, wire, and spikes used in the work during the past year were furnished in place by George W. Kiger, of Tillamook City, Oreg., under his proposal received in response to circular advertisement dated March 10, 1900. The prices for the materials in place were: Brush fascines, $3 per cord; rubblestone, $1 per ton; lumber, $16 per 1,000 feet B. M.; wire, 6½ cents per pound; spikes, 5 cents per pound. Operations under this advertisement and proposal, which were commenced June 25, 1900, were completed October 30, 1900.

The authorization of the purchase of about 1 acre of land, for use in connection with storing and mooring the Government plant when not in use, was mentioned on page 4318 of the last annual report. This land was purchased during the past year of Horace Holden, payment of the purchase price, $100, being made January 10, 1901. The boundaries of the land are as follows:

Beginning at a point 99 feet due west of United States meander corner at the southeast corner of lot 5, section 25, township 1 south, range 10 west, Willamette meridian; thence north 235.6 feet; thence west 100 feet; thence north 45 degrees west 200 feet; thence south 141.42 feet; thence south 45 degrees east 200 feet; thence south 94.18 feet; thence east 100 feet to point of beginning, containing 1 acre, more or less, in Tillamook County, Oreg.

During the past year the following-named public land was temporarily withdrawn from sale, for use in connection with the improvement of Tillamook Bay: Lot 1, section 19; lot 1, section 20; lots 1, 2, and 3, section 30, township 1 north, range 10 west, Willamette meridian, in Tillamook County, Oreg.

Mr. Frank Batter, inspector, has been in immediate charge of operations in progress during the past fiscal year.

A channel having the least depth of 9 feet at mean high tide from Hobsonville up to Tillamook City, as called for by the existing project for improvement, has been obtained. The existing project has, therefore, been completed. However, more or less work will be required to maintain this channel.

It seems proper to state in this connection that the people interested in the navigation of the channel between Hobsonville and Tillamook City are of opinion that the project for improvement should be extended to provide for obtaining a depth slightly greater than 9 feet at mean high tide in the channel, the reason for this being the fact that the small coasting vessels which now call at Tillamook City are of slightly greater draft than the small vessels which were in use at the time the project for improvement was adopted.

It is estimated that the sum of $27,000 named in the appended money statement as the amount, in addition to the small balance available July 1, 1901, that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of the existing improvement, will be required to make the existing dikes practically permanent, by placing additional rubblestone in and around them, and to dredge shoals which may form in the improved channel.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $12,676.44 |
| November 10, 1900, refundment of overpayments | [1]4.68 |
| | 12,681.12 |
| June 30, 1901, amount expended during fiscal year | 11,949.81 |
| July 1, 1901, balance unexpended | 731.31 |
| July 1, 1901, outstanding liabilities | 63.25 |
| July 1, 1901, balance available | 668.06 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of improvement, in addition to the balance unexpended July 1, 1901 | 27,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | |

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[1] Overpayment of $3.12 made on voucher No. 31, February, 1900, and overpayment of $1.56, made on voucher No. 36, March, 1900.

### APPROPRIATIONS.

| Act of— | |
|---|---|
| August 11, 1888 | $5,200.00 |
| September 19, 1890 | 500.00 |
| July 13, 1892 | 15,000.00 |
| August 18, 1894 | 16,000.00 |
| June 3, 1896 | 17,000.00 |
| March 3, 1899 | 25,000.00 |
| Refundment of overpayments, November 10, 1900 | 4.68 |
| Total | 78,704.68 |

### COMMERCIAL STATISTICS.

Tillamook Bay is in the collection district of Oregon. Astoria, near the mouth of the Columbia River, is the nearest port of entry. The nearest light-house is at Cape Meares, about 4 miles south of the entrance to the bay.

The following statistics are for the calendar year 1900:

*Receipts and shipments.*

| Articles. | Receipts. | Articles. | Shipments. |
|---|---|---|---|
| | *Tons.* | | *Tons.* |
| General merchandise | 2,415 | Lumber (7,390,000 feet) | 10,585 |
| Machinery and implements | 600 | Dairy produce, fish, chittim bark, and hides | 3,640 |
| Flour and feed | 400 | | |
| Total | 3,415 | Total | 14,225 |

Number of passengers arriving and departing by sea during the year, 1,198.

*List of coasting vessels crossing bar at entrance to Tillamook Bay, Oregon, during year ending December 31, 1900, which proceeded as far as or departed from Tillamook City, Oreg.*

| Name. | Character. | Length. | Breadth. | Depth of hold. | Draft fully laden. | Net tonnage. | Number of times arrived. | Number of times departed. | Total number times arrived and departed. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | | | | |
| Sue H. Elmore | Steam | 100 | 24 | 9 | 10 | 131 | 8 | 8 | 16 |
| W. H. Harrison | do | 92 | 20.1 | 6.8 | 8 | 52 | 24 | 24 | 48 |
| Sacramento | Sail | 100.7 | 31.2 | 6.5 | 8.5 | 124 | 2 | 3 | 5 |
| Enterprise | do | 100 | 31.5 | 9 | 10 | 180 | 1 | 1 | 2 |
| Total | | | | | | | | | 71 |

*List of coasting vessels crossing the bar at entrance to Tillamook Bay, Oregon, during year ending December 31, 1900, which did not go above nor depart from above Bay City, Oreg.*

| Name. | Character. | Length. | Breadth. | Depth of hold. | Draft, fully laden. | Net tonnage. | Number of times arrived. | Number of times departed. | Total number times arrived and departed. |
|---|---|---|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | | | | |
| Tillamook | Steam | 126.8 | 32.8 | 9.9 | 14 | 208 | 4 | 4 | 8 |
| Laguna | do | 116 | 30 | 9 | 13 | 142 | 1 | 1 | 2 |
| Kruger | do | 160 | 36 | 12 | 15 | 351 | 10 | 10 | 20 |
| Luella | do | 146 | 32 | 10.6 | 13.6 | 278 | 2 | 2 | 4 |
| Cleone | do | 115 | 31.2 | 9.5 | 14 | 140 | 1 | 1 | 2 |
| Enterprise | Sail | 100 | 31.5 | 9 | 10 | 180 | 2 | 2 | 4 |
| Total | | | | | | | | | 40 |

Total number of arrivals and departures of vessels at Tillamook Bay during the year, 111.

## V V 10.

## IMPROVEMENT OF UPPER COLUMBIA AND SNAKE RIVERS, OREGON AND WASHINGTON.

The plan prior to 1882 for removing obstructions to light-draft steamboats in the 265 miles of the Columbia and Snake rivers between Celilo, Oreg., on the Columbia, and Lewiston, Idaho, on the Snake, and since 1882 for removing obstructions to light-draft steamboats in the 78 miles of the Snake River between Riparia, Wash., and Asotin, Wash., and the results of operations in former years are mentioned in the summary of this report.

No work of improvement was in progress during the fiscal year ending June 30, 1901. The emergency river and harbor act approved June 6, 1900, called for an examination or survey of Snake River from head of navigation to the mouth of the stream in the Columbia River, with a view to improving Snake River. As the 67 miles of the Snake from its mouth up to Riparia was surveyed in 1897–98 (report of survey printed in House Doc. No. 411, Fifty-fifth Congress, second session; also in Annual Report of the Chief of Engineers for 1898, pp. 3013–3024), the survey made to comply with the act of June 6, 1900, was limited to the 73 miles from Riparia up to Lewiston, which latter point is the present head of regular navigation on Snake River This survey was made in July-September, 1900. The expense of making the survey was paid from the appropriation for improving Upper Columbia and Snake rivers. The report of the survey was printed as House Doc. No. 127, Fifty-sixth Congress, second session, to which attention is invited for details. The report contained an estimate of $23,000 for obtaining a low-water channel 5 feet deep and 60 feet wide between Lewiston and Riparia, and $5,000 every two years for maintenance. The sum of $28,000 is therefore named in the appended money statement as the amount, in addition to the small balance available July 1, 1901, that can be profitably expended in fiscal year ending June 30, 1903. Of this sum it is estimated that $23,000 will be required for works of improvement, such as dredging shoals and removing rocks between Lewiston and Riparia, and extending rubblestone deflecting dikes built in former years at Log Cabin Rapid and Goose Island Bar, 33 and 65 miles, respectively, below Lewiston, and that the remainder, $5,000, together with the small balance available July 1, 1901, will be required for maintenance of improvement, by placing additional rubblestone in the portions of the two dikes, named above, built in former years, the dikes having deteriorated considerably by reason of settlement due to high water and swift currents.

The 73 miles of the Snake River between Lewiston and Riparia is not considered unworthy of improvement at the present time to the limited extent contemplated in report of survey printed in House Doc. No. 127, Fifty-sixth Congress, second session, as that portion of the river is navigated regularly by steamboats. There is, however, no present necessity for the improvement of the 67 miles of the Snake from Riparia down to its mouth and the 125 miles of the Columbia from the mouth of the Snake down to Celilo, for the reason that steamboats have not regularly navigated the streams between Riparia and

Celilo since about 1882. It is not considered probable that navigation between Riparia and Celilo will be resumed, to any important extent at least, until some feasible provision is made by Congress for passing steamboats around the obstructions in the 12 miles of the Columbia between Celilo and The Dalles, Oreg., thus affording an all-water route of transportation, at least during a portion of each year, in the 541 miles of the Columbia and Snake, from the foot of Priest Rapids, in the Columbia, 73 miles above the mouth of the Snake, and from Asotin, on the Snake, down to the mouth of the Columbia in the Pacific Ocean. (See House Doc. No. 228, Fifty-sixth Congress, second session.)

*Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | $4,427.08 |
| January 29, 1901, reimbursement for property | | 43.70 |
| | | 4,470.78 |
| June 30, 1901, amount expended during fiscal year | | 4,173.37 |
| July 1, 1901, balance unexpended | | 297.41 |
| July 1, 1901, outstanding liabilities | | 50.00 |
| July 1, 1901, balance available | | 247.41 |
| Amount (estimated) required for completion of existing project | | Indefinite. |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901: | | |
| For works of improvement | $23,000.00 | |
| For maintenance of improvement | 5,000.00 | |
| | | $28,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | | |

APPROPRIATIONS.

| | | |
|---|---|---|
| Upper Columbia River, act of— | | |
| June 10, 1872 | $50,000.00 | |
| June 23, 1874 | 20,000.00 | |
| March 3, 1875 | 35,000.00 | |
| Total | | $105,000.00 |
| Upper Columbia and Snake rivers, act of— | | |
| August 14, 1876 | 15,000.00 | |
| June 18, 1878 | 20,000.00 | |
| March 3, 1879 | 20,000.00 | |
| June 14, 1880 | 15,000.00 | |
| March 3, 1881 | 15,000.00 | |
| August 2, 1882 | 6,000.00 | |
| July 5, 1884 | 20,000.00 | |
| August 5, 1886 | 10,000.00 | |
| August 11, 1888 | 10,000.00 | |
| September 19, 1890 | 20,000.00 | |
| July 13, 1892 | 15,000.00 | |
| August 18, 1894 | 5,000.00 | |
| June 3, 1896 | 5,000.00 | |
| March 3, 1899 | 7,500.00 | |
| Total | | 183,500.00 |
| December 30, 1897, reimbursement for property | | 414.00 |
| July 12, 1899, reimbursement for property | | 365.00 |
| January 29, 1901, reimbursement for property | | 43.70 |
| Aggregate | | 289,322.70 |

COMMERCIAL STATISTICS FOR YEAR ENDING DECEMBER 31, 1900.

| Articles. | Exported. | Imported. |
|---|---|---|
| | *Tons.* | *Tons.* |
| Fruit | 1,147 | 43 |
| Grain | 25,216 | 15 |
| Live stock | 591 | 12 |
| Lumber | 161 | 612 |
| Merchandise | 4,152 | 3,735 |
| Wool | 236 | ........... |
| Total | 31,503 | 4,417 |

The Oregon Railroad and Navigation Company operates a regular line of steamboats in Snake River between Riparia, Wash., and Lewiston, Idaho, connecting at Riparia with the Portland-Spokane rail line of that company. These steamboats make occasional trips for short distances below Riparia and above Lewiston when the river is at a favorable stage and sufficient freight is offered. There are four steamboats in the river, the *Lewiston*, *Almota*, *Spokane*, and *Norma*, the net tonnage of each being between 400 and 500 and their draft, fully laden, about 5 feet.

## V V II.

## IMPROVEMENT OF COLUMBIA RIVER AT THREE-MILE RAPIDS AND THE CONSTRUCTION AND EQUIPMENT OF A BOAT RAILWAY FROM THE FOOT OF THE DALLES RAPIDS TO THE HEAD OF CELILO FALLS.

The project for constructing a boat railway about 9 miles long to pass steamboats overland around the obstructions in the Columbia River between the towns of The Dalles, Oreg., and Celilo, Oreg., the results of operations in former years, and other data are mentioned in the summary of this report.

There were no operations during the past fiscal year other than those connected with making an examination and survey of the river from the foot of The Dalles Rapids up to the head of Celilo Falls, with the view of overcoming the obstructions to navigation by means of canals and locks. This examination and survey was provided for by the emergency river and harbor act of June 6, 1900. The report on same was printed as House Doc. No. 228, Fifty-sixth Congress, second session, to which attention is invited for details.

Should Congress authorize the construction of canals and locks, the balance available July 1, 1901, can be used to advantage in fiscal year ending June 30, 1903, in removing the clusters of rocks extending into the river from both shores at Three-mile Rapids and in obtaining title to land required for the canals and locks around Five-mile Rapids and Celilo Falls.

No actual construction work having been as yet started under this appropriation there was no deterioration during the fiscal year ending June 30, 1901.

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $220,291.49 |
| June 30, 1901, amount expended during fiscal year | 5,712.23 |
| July 1, 1901, balance unexpended | 214,579.26 |
| Amount (estimated) required for completion of existing project | 2,014,467.00 |

#### APPROPRIATIONS.

| | |
|---|---|
| Act of— | |
| August 18, 1894 | $100,000 |
| June 3, 1896 | 150,000 |
| Total | 250,000 |

#### COMMERCIAL STATISTICS.

As the Columbia River between The Dalles, Oreg., and Celilo, Oreg., is completely obstructed by rapids, falls, contracted channels, and clusters of basalt reefs, etc., navigation is not practicable at any stage between those points. All commerce along this stretch of the river is hauled by the rail line of the Oregon Railroad and Navigation Company.

## V V 12.

## CONSTRUCTION OF CANAL AT THE CASCADES, COLUMBIA RIVER, OREGON.

The existing project for the construction of a canal and locks to pass steamboats around the upper (principal) rapid in the Columbia River at the Cascades, about 150 miles above the mouth of the river in the Pacific Ocean, and the results of operations in former years, are mentioned in the summary of this report.

The work of completing the canal and locks is being carried on under the project (report of Board of Engineer officers) printed in the Annual Report of the Chief of Engineers for 1895, pages 3571–3582.

The items comprising this project, and the results of work on each item, up to June 30, 1900, are mentioned in the Annual Report of the Chief of Engineers for 1900, pages 4324–4328.

Operations during the fiscal year ending June 30, 1901, were in continuation of those in progress June 30, 1900, and were as follows:

*Item 1.*—As stated on page 4326 of the last annual report, work on this item (rebuilding the protection embankment or wing on the river side of the lower entrance to the canal) was suspended during the last fiscal year on account of high water. In August, 1900, the river having fallen sufficiently, the work of completing the level pavement at references 92 and 100 was commenced. All work on this item was completed during the same month (August, 1900). The excavation and paving necessary to complete the item was done by Hosea W. Taylor, under contract dated September 19, 1899.

*Item 2.*—The work of repairing a portion of the slope wall laid against the south bank of the canal below the lower guard gate was commenced in August, 1900, and completed on February 27, 1901, under contract with Hosea W. Taylor, dated September 19, 1899. In excavating for the toe of the slope pavement where it joins the lower end of the canal wall it was found that the end of the cut-stone wall of the canal had been undermined by the heavy swell during high water, and to obtain a proper foundation for the slope wall it was necessary to lay some pavement in mortar. The excavation at the end of the cut-stone wall of the canal was therefore carried down to low-water level and the pavement at that place laid in mortar and joined to the cut stone of the canal wall. To prevent the undermining of the lower end of the pavement above the coping of the canal wall a strip of the pavement running up to ordinary high-water level was also laid with mortar and covered with a revetment of riprap. The condition of the damaged portion of the slope wall before it was repaired is shown by photographs Nos. 401 and 403, opposite page 3224 of the Annual Report of the Chief of Engineers for 1899. The photograph forwarded herewith shows the slope wall as repaired during the past year.

*Additional paving.*—At the beginning of the fiscal year the work of paving the slope on the north side of the upper lock was in progress.

This work was completed, as far as possible at present, in July, 1900, under contract with Hosea W. Taylor, dated September 19, 1899.

After the north wall of the upper lock has been completed (item 4) and the fill behind the wall raised to grade, about 200 yards of additional paving will be necessary on the north side of the upper guard gate. At the beginning of the fiscal year the work of paving on the south side of the lower lock, next above and joining that included in item 2, was in progress. This portion of the paving was completed in October, 1901, under the contract with Hosea W. Taylor, dated September 19, 1899. To complete the additional paving on the south side of the canal it will be necessary to place about 2,300 cubic yards of slope pavement and about 1,000 cubic yards of dry rubble in revetment over toe of slope and in ramps. This can not be placed until the walls of the upper lock are completed.

*Miscellaneous.*—A wire fence along the boundary of the Government land was constructed by Hosea W. Taylor, under the contract dated September 19, 1899, 2,660 feet of this fence being completed in July, 1900, and the remainder, 932 feet, in February, 1901.

The quantities of materials excavated and placed during the past fiscal year by Hosea W. Taylor, under the contract dated September 19, 1899, were as follows:

| Classification of work. | Item 1.—Rebuilding protection embankment on north side of lower entrance to canal. | | Item 2.—Repairing slope wall on south bank of canal below lower guard gate. | |
|---|---|---|---|---|
| | Amount. | Cost. | Amount. | Cost. |
| | *Cu. yds.* | | *Cu. yds.* | |
| Rock excavation, at $1.25 | | | 5 | $6.25 |
| Earth excavation, at $0.29 | 376 | $109.04 | 8,800 | 2,552.00 |
| Dry rubble, at $1 | | | 1,810 | 1,810.00 |
| Dry slope pavement, at $3.05 | 43 | 131.15 | 4,557 | 13,898.85 |
| Dry level pavement, at $1.99 | 405 | 805.95 | 1,826 | 3,633.74 |
| Rubble pavement in mortar, at $6.45 | | | 58 | 374.10 |
| Wire fence, at $0.22 | | | | |
| Gross amount earned by contractor | | 1,046.14 | | 22,274.94 |
| Less deductions for rent of Government plant, and for Government materials sold to contractor | | | | |
| Net amount earned by the contractor | | | | |

| Classification of work. | Item "Additional paving." |  | Wire fence. |  | Total amount of work. | Total cost of work. |
|---|---|---|---|---|---|---|
|  | Amount. | Cost. | Amount. | Cost. |  |  |
|  | *Cu. yds.* |  | *Lin. ft.* |  | *Cu. yds.* |  |
| Rock excavation, at $1.25 |  |  |  |  | 5 | $6.25 |
| Earth excavation, at $0.29 | 3,545 | $1,028.05 |  |  | 12,721 | 3,689.09 |
| Dry rubble, at $1 | 684 | 684.00 |  |  | 2,494 | 2,494.00 |
| Dry slope pavement, at $3.05 | 1,817 | 5,541.85 |  |  | 6,417 | 19,571.85 |
| Dry level pavement, at $1.99 |  |  |  |  | 2,231 | 4,439.69 |
| Rubble pavement in mortar, at $6.45 |  |  |  |  | 58 | 374.10 |
|  |  |  |  |  | *Lin. ft.* |  |
| Wire fence, at $0.22 |  |  | 31,365.22 | $790.24 | 3,592 | 790.24 |
| Gross amount earned by contractor |  | 7,253.90 |  | 790.24 |  | 3,592.25 |
| Less deductions for rent of Government plant, and for Government materials sold to contractor |  |  |  |  |  | 1,717.00 |
| Net amount earned by the contractor |  |  |  |  |  | 29,648.22 |

*Item 8.*—The four A-shaped trestles of the movable dam above the upper gates were placed in position and connected with their bearing castings on the bottom of the canal in October, 1901, this work being done by hired labor.

*Miscellaneous.*—A cobblestone gutter was partially constructed by hired labor on the south side of the upper entrance to the canal to carry off surface water which might otherwise undermine the slope pavement on the south side of the upper entrance. This work is still in progress and will be completed as soon as the necessary drain tile is received. The drain tile has been ordered of the manufacturers, but has not been delivered. White clover seed was sown on the earth slopes above the rock pavements, a number of trees were planted on the embankment separating the river from the canal, and about 650 feet of hedge fence set out along the boundary line of the Government land near the railroad of the Oregon Railroad and Navigation Company.

Mr. W. G. Brown, inspector, was in immediate charge of the operations during the past fiscal year.

No deterioration occurred during the past fiscal year.

The $150,000 named in the appended money statement, together with the small balance available July 1, 1901, can be profitably expended in fiscal year ending June 30, 1903, in completing the work of raising the height of the embankment separating the river from the canal and the work of protecting the river side of this embankment with riprap (item 3); in raising the height of the incomplete walls of the upper lock (item 4); in completing all paving on both sides of the canal (item "additional paving"); in purchasing and placing all the iron stairways (item 6), and in constructing lock-keepers' houses (item 9).

### *Money statement.*

|  |  |
|---|---|
| July 1, 1900, balance unexpended | $50,651.74 |
| June 30, 1901, amount expended during fiscal year | 45,005.01 |
| July 1, 1901, balance unexpended | 5,646.73 |
| July 1, 1901, outstanding liabilities | 228.00 |
| July 1, 1901, balance available | 5,418.73 |
| Amount (estimated) required for completion of existing project | 259,260.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 150,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. |  |

### APPROPRIATIONS.

| Act of— | |
|---|---|
| August 14, 1876 | $90,000 |
| June 18, 1878 | 150,000 |
| March 3, 1879 | 100,000 |
| June 14, 1880 | 100,000 |
| March 3, 1881 | 100,000 |
| August 2, 1882 | 265,000 |
| July 5, 1884 | 150,000 |
| August 5, 1886 | 187,500 |
| August 11, 1888 | 300,000 |
| September 19, 1890 | $435,000 |
| July 13, 1892 | 326,250 |
| March 3, 1893 | 1,239,653 |
| June 3, 1896 | 50,000 |
| June 11, 1896 | 179,597 |
| March 3, 1899 | 75,000 |
| Total | 3,748,000 |

### *Contract in force.*

| Contractor. | Date of contract. | Date of approval. | Date of beginning work. | Date of expiration. |
|---|---|---|---|---|
| Hosea W. Taylor | Sept. 19, 1899 | Oct. 4, 1899 | Nov. 15, 1899 | June 5, 1901 |

This contract was completed February 27, 1901.

The rates paid for materials excavated and placed by the contractor were printed in the Annual Report of the Chief of Engineers for 1900, page 4329.

### COMMERCIAL STATISTICS.

For commercial statistics, etc., see annual report for "Operating and care of canal and locks at the Cascades of the Columbia River, Oregon."

## V V 13.

## OPERATING AND CARE OF CANAL AND LOCKS AT THE CASCADES OF THE COLUMBIA RIVER, OREGON.

The canal and locks around the cascades of the Columbia River, about 150 miles above the mouth of the latter in the Pacific Ocean, and which, although incomplete, enable steamboats drawing 8 feet of water to run as far up the stream as The Dalles, Oreg., about 200 miles above the mouth, were formally opened to navigation November 5, 1896, and were operated continuously during the fiscal year ending June 30, 1901, with the exception of the period from May 29 to June 9, 1901, inclusive, when they were closed on account of high water.

The operations during the fiscal year ending June 30, 1901, aside from operating the locks, consisted principally of continuing the work of cleaning the steel lock gates of rust, scale, and old paint by means of sand blast, and repainting them with two coats of red lead.

This work (which was commenced in March, 1900) was performed principally by the regular lockmen while not engaged in operating the locks. The sand-blast machine used in this work was described in a general way in the Annual Report of the Chief of Engineers for 1900 (p. 4330). The total surface of the gates cleaned and repainted, from March 17, 1900, to June 30, 1901, has been 81,200 square feet.

Thus far the cost of cleaning the gates by means of sand blast has been $22.74 per 1,000 square feet; cost for applying the first coat of paint, $4.63 per 1,000 square feet, and the cost of applying the second coat of paint, $4.24, making the total cost for cleaning and repainting $31.61 per 1,000 square feet. About 15,000 square feet of the surfaces of the lower lock gate and the lower guard gate remain to be cleaned and repainted.

During the past fiscal year the steel-wire cables, by which the gates are opened and closed, were renewed on all except the upper guard gate.

All operations during the past fiscal year have been conducted by hired labor under the immediate charge of Mr. W. G. Brown, inspector.

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $6,318.87 |
| July 25, 1900, allotment | 11,121.41 |
| | 17,440.28 |
| June 30, 1901, amount expended during fiscal year | 5,433.91 |
| July 1, 1901, balance unexpended | 12,006.37 |
| July 1, 1901, outstanding liabilities | 181.00 |
| July 1, 1901, balance available | 11,825.37 |

### ALLOTMENTS.

| | | | |
|---|---|---|---|
| November 4, 1896 | $2,500.00 | July 22, 1899 | $3,047.77 |
| May 21, 1897 | 350.00 | July 25, 1900 | 11,121.41 |
| August 21, 1897 | 4,000.00 | | |
| October 30, 1897 | 1,500.00 | Total | 36,388.54 |
| July 26, 1898 | 13,869.36 | | |

*Statement of expenditures made in operating and caring for canal and locks at cascades of the Columbia River, Oregon, during the fiscal year 1901, submitted in compliance with river and harbor act of July 5, 1884.*

| | |
|---|---|
| Labor | $3,503.43 |
| Materials for repairs | 815.60 |
| Tools, fuel, oil, etc | 649.37 |
| Superintendence and contingencies | 465.51 |
| Total | 5,433.91 |

## COMMERCIAL STATISTICS.

*Canal at Cascades, Oregon, summary of business, etc., during fiscal year ending June 30, 1901.*

| Month. | Average gauge reading, 12 m. |  | Number of lockages. | Locks operated. |  | Number of passengers. |  |  |  | Total. |
|---|---|---|---|---|---|---|---|---|---|---|
|  | Upper. | Lower. |  |  |  | Stern wheel. | Raft. | Propeller. | Barge or sail. |  |
| 1900. |  |  |  | *h.* | *m.* |  |  |  |  |  |
| July | 111.3 | 95.4 | 96 | 18 | 49 | 58 | ...... | 57 | ........ | 115 |
| August | 104.7 | 85.1 | 86 | 14 | 30 | 64 | 1 | 32 | ........ | 97 |
| September | 101.5 | 80.3 | 88 | 14 | 35 | 78 | ...... | 10 | ........ | 88 |
| October | 100.1 | 78.3 | 78 | 14 | 50 | 76 | 1 | 1 | ........ | 78 |
| November | 100.9 | 79.5 | 52 | 9 | 40 | 52 | ...... | ........ | ........ | 52 |
| December | 101.9 | 81.0 | 52 | 8 | 40 | 52 | ...... | ........ | ........ | 52 |
| 1901. |  |  |  |  |  |  |  |  |  |  |
| January | 101.2 | 79.9 | 56 | 9 | 20 | 39 | ...... | 17 | ........ | 56 |
| February | 100.7 | 79.0 | 49 | 8 | 10 | 42 | ...... | 7 | ........ | 49 |
| March | 104.8 | 85.4 | 55 | 9 | 10 | 30 | ...... | 25 | ........ | 55 |
| April | 103.4 | 83.1 | 52 | 8 | 40 | 46 | ...... | 6 | ........ | 52 |
| May | 116.1 | 101.3 | 72 | 17 | 30 | 74 | ...... | ........ | ........ | 74 |
| June | 119.6 | 105.8 | 62 | 12 | 50 | 60 | ...... | 2 | ........ | 62 |
| Total | ........ | ........ | 798 | 146 | 44 | 671 | 2 | 157 | ........ | 830 |

| Month. | Registered tonnage. | Freight carried. | Passengers. | Vessels. | Delayed. |  |
|---|---|---|---|---|---|---|
| 1900. |  | *Tons.* | *Number.* | *Number.* | *h.* | *m.* |
| July | 23,687 | 1,275.25 | 5,581 | .......... | .......... |  |
| August | 23,505 | 2,078.25 | 4,381 | .......... | .......... |  |
| September | 32,620 | 5,285.50 | 3,751 | .......... | .......... |  |
| October | 30,151 | 5,645.75 | 2,855 | .......... | .......... |  |
| November | 16,391 | 1,422.75 | 1,783 | 1 | 1 | 10 |
| December | 16,406 | 1,248.25 | 1,927 | .......... | .......... |  |
| 1901. |  |  |  |  |  |  |
| January | 14,185 | 666.25 | 1,390 | .......... | .......... |  |
| February | 13,919 | 604.50 | 1,507 | .......... | .......... |  |
| March | 12,155 | 931.25 | 1,929 | .......... | .......... |  |
| April | 15,197 | 1,315.00 | 2,182 | .......... | .......... |  |
| May | 26,431 | 1,191.00 | 3,524 | 2 | 2 | 00 |
| June | 22,177 | 762.25 | 3,952 | .......... | .......... |  |
| Total | 246,824 | 22,426.00 | 34,762 | 3 | 3 | 10 |

*Statement of traffic passing through canal at Cascades, Oregon, during fiscal year ending June 30, 1901.*

| Month. | Bound up. |  |  |  |  |  |  |
|---|---|---|---|---|---|---|---|
|  | Hay. | Cattle. | Horses. | Sheep. | Miscellaneous live stock. | Lumber. | Miscellaneous merchandise. |
| 1900. | *Tons.* | *No.* | *No.* | *No.* | *No.* | *Feet B. M.* | *Tons.* |
| July | 3.00 | 14 | 145 | .......... | 50 | 19,516 | 664.25 |
| August | 2.00 | 5 | 65 | 125 | 5 | 26,030 | 522.50 |
| September | 12.50 | 26 | 115 | 58 | 186 | 86,446 | 387.00 |
| October | 28.75 | 31 | 169 | 20 | .......... | 31,022 | 682.04 |
| November | 3.00 | 19 | 49 | .......... | .......... | 20,430 | 311.75 |
| December | 31.50 | 13 | 89 | .......... | 8 | 5,150 | 335.25 |
| 1901. |  |  |  |  |  |  |  |
| January | 2.75 | .......... | 24 | .......... | .......... | .......... | 248.25 |
| February | .......... | 7 | 68 | .......... | .......... | .......... | 328.00 |
| March | 3.50 | 25 | 119 | .......... | .......... | .......... | 363.00 |
| April | 11.25 | 53 | 201 | 15 | 2 | 13,115 | 533.22 |
| May | 8.75 | 17 | 232 | 218 | 2 | 7,762 | 458.07 |
| June | 5.50 | 34 | 123 | 6 | .......... | 10,980 | 329.75 |
| Total | 112.50 | 244 | 1,399 | 442 | 253 | 220,451 | 5,163.08 |

*Statement of traffic passing through canal at Cascades, Oregon, etc.*—Continued.

| Month. | Bound up. | | Bound down. | | | | |
|---|---|---|---|---|---|---|---|
| | Total cargo. | Passengers. | Wheat. | Flour. | Miscellaneous grain. | Cattle. | Horses. |
| 1900. | *Tons.* | *No.* | *Lbs.* | *Lbs.* | *Lbs.* | *No.* | *No.* |
| July | 797.50 | 3,412 | 93,500 | .......... | 188,300 | .......... | 125 |
| August | 612.00 | 1,961 | 1,029,000 | 60,250 | .......... | 23 | 421 |
| September | 623.75 | 1,637 | 7,342,520 | 14,500 | 40,050 | 152 | 212 |
| October | 879.25 | 1,346 | 7,385,820 | 45,500 | 732,120 | 108 | 186 |
| November | 385.25 | 778 | 1,239,700 | 45,000 | 98,000 | 53 | 139 |
| December | 437.50 | 859 | 999,000 | .......... | 130,000 | 14 | 133 |
| 1901. | | | | | | | |
| January | 266.00 | 714 | 310,500 | 20,750 | 105,000 | 1 | 65 |
| February | 373.75 | 735 | .......... | .......... | 48,000 | 20 | 96 |
| March | 453.00 | 1,185 | .......... | 77,950 | 48,500 | 24 | 311 |
| April | 720.25 | 1,298 | .......... | 31,000 | 100,000 | 7 | 247 |
| May | 643.25 | 1,926 | 182,000 | 15,300 | 26,715 | 24 | 292 |
| June | 446.00 | 1,872 | 94,000 | .......... | .......... | 16 | 203 |
| Total | 6,637.50 | 17,723 | 18,676,040 | 310,250 | 1,516,685 | 442 | 2,430 |

| Month. | Bound down. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Sheep. | Miscellaneous live stock. | Wool. | Berries and fruit. | Lumber. | Miscellaneous merchandise. | Total cargo. | Passengers. |
| 1900. | *No.* | *No.* | *Lbs.* | *Lbs.* | *Ft. B. M.* | *Tons.* | *Tons.* | *No.* |
| July | 900 | 30 | 97,500 | 43,500 | 19,200 | 122.50 | 477.75 | 2,169 |
| August | 4,013 | 22 | 419,500 | 89,500 | 29,700 | 132.25 | 1,466.25 | 2,420 |
| September | 5,344 | 3 | 82,918 | 214,000 | 23,000 | 311.25 | 4,661.75 | 2,114 |
| October | 3,691 | 50 | 83,640 | 52,000 | 17,000 | 222.00 | 4,766.50 | 1,509 |
| November | 1,110 | 178 | 32,402 | 25,500 | 2,630 | 137.00 | 1,037.50 | 1,005 |
| December | 295 | .......... | 5,000 | 18,250 | 1,200 | 118.25 | 810.75 | 1,068 |
| 1901. | | | | | | | | |
| January | .......... | 60 | 54,000 | 4,950 | .......... | 108.75 | 400.25 | 676 |
| February | .......... | .......... | 31,800 | .......... | .......... | 121.00 | 230.75 | 772 |
| March | 400 | .......... | 18,000 | 25,850 | .......... | 167.00 | 478.25 | 744 |
| April | 5 | .......... | 326,000 | 3,750 | 10,900 | 190.00 | 594.75 | 884 |
| May | 450 | 124 | 49,000 | 1,300 | 2,470 | 183.75 | 547.75 | 1,598 |
| June | .......... | .......... | 68,000 | .......... | 12,410 | 81.25 | 316.25 | 2,080 |
| Total | 16,208 | 467 | 1,267,760 | 478,600 | 118,510 | 1,895.00 | 15,788.50 | 17,039 |

*List of vessels passing through canal at the Cascades, Columbia River, Oregon, during fiscal year ending June 30, 1901.*

| Name. | Character. | Length. | Breadth. | Depth of hold. | Net tonnage. | No. of times passed through canal during fiscal year. |
|---|---|---|---|---|---|---|
| | | *Feet.* | *Feet.* | *Feet.* | | |
| Bailey Gatzert | Stern-wheel steamboat | 177.3 | 32.3 | 8 | 444 | 48 |
| Dalles City | do | 150 | 30.9 | 8.2 | 323 | 320 |
| Gamecock | do | 178.2 | 38 | 7.9 | 658 | 38 |
| G. W. Shaver | do | 139.6 | 28.2 | 5.4 | 276 | 20 |
| Iralda | Propeller steamboat | 99.2 | 17.6 | 3.7 | 59 | 16 |
| Kehani | Stern-wheel steamboat | 90 | 17 | 6 | 85 | 1 |
| Pearl | Propeller steamboat | 44.7 | 10.2 | 3.6 | 8 | 2 |
| Regulator | Stern-wheel steamboat | 157 | 34.4 | 7.7 | 308 | 244 |
| Reliance | Propeller steamboat | 118 | 20.5 | 6.5 | 104 | 139 |
| Total | .......... | .......... | .......... | .......... | .......... | 828 |

*Meteorological and gauge record for the year.*

| Months. | Rainfall. | Days on which rain or snow fell. | Average temperature at 12 m. | Highest reading of gauges. | | Lowest reading of gauges. | |
|---|---|---|---|---|---|---|---|
| | | | | Head of canal. | Foot of canal. | Head of canal. | Foot of canal. |
| 1900. | *Inches.* | | ° | | | | |
| July | 0.26 | 5 | 41.8 | 116.4 | 102.3 | 107.4 | 89.6 |
| August | 1.32 | 5 | 70.4 | 107.4 | 89.6 | 102.9 | 82.3 |
| September | 3.00 | 11 | 64.4 | 103.1 | 82.5 | 100.5 | 79 |
| October | 12.84 | 19 | 56.2 | 101.8 | 80.7 | 99 | 76.5 |
| November | 10.52 | 16 | 48.3 | 102.4 | 81.5 | 99.8 | 77.9 |
| December | 10.96 | 21 | 47.5 | 104.7 | 85.7 | 100.1 | 78.3 |
| 1901. | | | | | | | |
| January | 11.87 | 19 | 40.6 | 103.8 | 83.5 | 99.6 | 77.4 |
| February | 15.20 | 16 | 39.9 | 106.1 | 87.2 | 97.4 | 74 |
| March | 9.54 | 21 | 51.9 | 109.6 | 92.8 | 102.5 | 81.8 |
| April | 5.61 | 17 | 57.9 | 106.2 | 87.3 | 101.8 | 80.7 |
| May | 2.66 | 11 | 65.4 | 125.2 | 111.8 | 105.7 | 86.6 |
| June | 1.95 | 12 | 66.5 | 125.7 | 112.3 | 115 | 100.7 |
| Total | 85.73 | 173 | 54.2 | | | | |

| | |
|---|---|
| Highest reading at head of canal during the year | 125.7 |
| Highest reading at foot of canal during the year | 112.3 |
| Lowest reading at head of canal during the year | 97.4 |
| Lowest reading at foot of canal during the year | 74 |

NOTE.—Reading of adopted low water at head of canal is 96; reading of adopted low water at foot of canal is 72.

## V V 14.

## IMPROVEMENT OF COLUMBIA RIVER BETWEEN VANCOUVER, WASHINGTON, AND MOUTH OF WILLAMETTE RIVER.

The project for increasing the depth from 9 feet to about 20 feet over a sand bar in the Columbia River, about 2½ miles below Vancouver, Wash., by means of scour, to be produced by a dike extending from the Oregon shore to the head of Hayden Island, and the results of operations in former years are mentioned in the summary of this report.

The operations during fiscal year ending June 30, 1901, consisted of maintaining the main dike, the two cross dikes connecting the main dike with the head of Hayden Island, and the brush fascine and rubblestone revetment placed in former years on the head of the island to prevent erosion. This work of maintenance was authorized by the Chief of Engineers, October 22, 1900. All the materials for this work of maintenance were furnished in place in the dikes and on the head of the island by the Hale & Kern Contract Company, of Portland, Oreg., under circular advertisement inviting proposals, dated October 12, 1900. This company commenced operations November 14, 1900, and completed them December 11, 1900, placing the following-named quantities of materials in the main and cross dikes and on the head of the island:

| | |
|---|---|
| Rubblestone, 2,170.777 tons, at $1.75 | $3,798.86 |
| Rubblestone, 386.6 tons, at 38.799 cents | 150.00 |
| Brush fascines, 181.08 cords, at $3.50 | 633.78 |
| Galvanized iron wire, 287 pounds, at 4¼ cents | 12.20 |
| Steel wire strand, 5,800 feet, at $8.95 per 1,000 feet | 51.91 |
| Lumber, 408 feet B. M., at $20 | 8.16 |
| Spikes, 110.5 pounds at 10 cents | 11.05 |
| Total | 4,665.96 |

The placing of the above-named materials was necessary to compensate for settlement of the brush and stone filling in the dikes and settlement of the revetment work on the head of the island, caused by the high water of the summer of 1900.

On June 18, 1901, the sum of $8,000 was allotted from the appropriation for emergencies in river and harbor works, act of June 6, 1900, with which to place additional brush and rubblestone in the dikes and on the head of the island, to compensate for settlement caused by the high water of the summer of 1901, and it is proposed to place these additional materials in the work during the next low-water period, in the fall months of 1901.

At this time it is estimated that the sum of $12,000, in addition to the balance available July 1, 1901, will be required during fiscal year ending June 30, 1903, to maintain the dikes and revetment work, this work of maintenance to consist of placing additional brush and rubblestone in the dikes and on the head of the island to offset settlement which it is anticipated will take place during the high water of the summers of 1902 and 1903. Accordingly, the sum of $12,000 is named in the appended money statement for maintenance of improvement during fiscal year ending June 30, 1903. It is considered important that funds for maintaining the dikes and the revetment work be available to fill up breaks and low places in the dikes promptly upon the subsidence of each annual flood, otherwise the work may be seriously damaged by succeeding all-summer floods.

At this time this improvement is not considered an unworthy one, provided operations are limited to maintaining the dikes and revetment work already constructed.

## *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $5,460.02 |
| June 18, 1901, allotment | 8,000.00 |
| | 13,460.02 |
| June 30, 1901, amount expended during fiscal year | 5,422.02 |
| July 1, 1901, balance unexpended | 8,038.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of improvement, in addition to the balance unexpended July 1, 1901<br>Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | 12,000.00 |

---

### APPROPRIATIONS.

| | |
|---|---|
| Act of— | |
| July 13, 1892 | $33,000 |
| June 3, 1896 | 67,000 |
| June 6, 1900 (allotment of June 18, 1901) | 8,000 |
| | 108,000 |
| February 2, 1900, refundment of overpayment | 1 |
| Total | 108,001 |

## V V 15.

### IMPROVEMENT OF CLEARWATER RIVER, IDAHO.

As stated in the summary of this report, the unexpended funds are held in the Treasury to await future developments regarding the necessity for further improving the stream.

The expenditures during fiscal year ending June 30, 1901, were limited to properly caring for the Government plant stored at Lewiston, Idaho.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $12,876.18 |
| June 30, 1901, amount expended during fiscal year | 121.36 |
| July 1, 1901, balance unexpended | 12,754.82 |

APPROPRIATIONS.

| | |
|---|---|
| Act of— | |
| March 3, 1879 | $5,000.00 |
| June 14, 1880 | 5,000.00 |
| August 2, 1882 | 5,000.00 |
| June 3, 1896 | 25,000.00 |
| March 3, 1899 | 10,000.00 |
| | 50,000.00 |
| December 30, 1897, reimbursement for property transferred | 2.00 |
| March 23, 1898, refundment of overpayment | .50 |
| Total | 50,002.50 |

COMMERCIAL STATISTICS.

No commerce was carried on the stream during the calendar year 1900.

## V V 16.

### EXAMINATION AND SURVEY OF COLUMBIA RIVER, OREGON AND WASHINGTON.

[Printed in House Doc. No. 228, Fifty-sixth Congress, second session.]

Office of the Chief of Engineers,
United States Army,
*Washington, December 18, 1900.*

Sir: I have the honor to submit herewith copies of reports, dated June 22, 1900, and November 30, 1900, by Capt. William W. Harts, Corps of Engineers, upon preliminary examination and survey, respectively, of Columbia River, authorized by the emergency river and harbor act approved June 6, 1900, as follows:

> Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington: with a view to the construction of a canal and locks to overcome the obstructions to navigation.

The object of the proposed improvement is definitely stated by the act, and attention is invited to the accompanying papers, particularly to Captain Harts's survey report of November 30, 1900, in which the subject is thoroughly discussed. The estimated cost of the necessary work is given as $3,969,371, or, in round numbers, $4,000,000.

Very respectfully, your obedient servant,

John M. Wilson,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

Hon. Elihu Root,
*Secretary of War.*

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## PRELIMINARY EXAMINATION OF COLUMBIA RIVER BETWEEN THE FOOT OF THE DALLES RAPIDS AND THE HEAD OF CELILO FALLS, OREGON AND WASHINGTON, WITH A VIEW TO THE CONSTRUCTION OF CANALS AND LOCKS.

Engineer Office, United States Army,
*Portland, Oreg., June 22, 1900.*

General: I have the honor to acknowledge the receipt of letter dated Office of the Chief of Engineers, United States Army, June 13, 1900, assigning to me the duty of making a preliminary examination under the following-quoted provision of the act of Congress approved June 6, 1900:

> Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington: with a view to the construction of a canal and locks to overcome the obstructions of navigation.

Having previously visited the locality personally, the data already at hand is sufficient to enable me to report, without making further examination, that the Columbia River between The Dalles Rapids and the head of Celilo Falls, Oregon and Washington, is worthy of improvement to the extent of making a survey with a view to the construction of a canal or canals and locks to overcome the obstructions to navigation.

### CONDITION OF RIVER.

The Columbia River is navigated by ocean vessels drawing 20 feet of water from the mouth of the river in the Pacific Ocean up to the mouth of the Willamette River, a distance of about 100 miles. From the mouth of the Willamette River up to the town of The Dalles, Oreg. (near the foot of The Dalles Rapids), a farther distance of about 110 miles, the Columbia River can be navigated by river steamboats drawing up to 8 feet of water. From the foot of The Dalles Rapids up to Celilo Falls, 12 miles, navigation in the Columbia River is completely obstructed at all times by reason of the gorged condition of the channel, obstructing rocks, and powerful currents and eddies. At Celilo Falls there is also a sheer fall of 20 feet at low water. In the 12 miles between The Dalles, Oreg., and Celilo Falls there is a total fall in the river of 81 feet at low water, and at high stages the fall is about 60 feet. From Celilo Falls up to Wallula, Wash., about 115 miles, the Columbia River is not now used by boats, but was formerly navigated by light-draft steamboats up to about twenty years ago, when the boats were withdrawn from the river on account of the construction of the railroad of the Oregon Railroad and Navigation Company, which railroad parallels the river from Troutdale, Oreg. (a small station 18 miles east of Portland), to Wallula, Wash., a distance of about 200 miles. From Wallula up to the mouth of Snake River, about 10 miles, navigation in the Columbia is much impeded at low water.

From the mouth of Snake River up to Priest Rapids, about 73 miles, light-draft steamboat navigation in the Columbia is fairly good. Priest Rapids cover about 10 miles of river, with a fall of about 72 feet in this distance, and are not considered navigable for commercial purposes. Until improved they will probably form the head of practicable unbroken navigation in the Columbia from Celilo Falls upstream. From the foot of Priest Rapids to the boundary of British Columbia, about 350 miles, navigation is much obstructed by rocks and rapids. As above indicated, the Snake River empties into the Columbia about 125 miles above Celilo Falls. From its mouth up to Riparia, Wash., 67 miles, the Snake is navigated only during the high-water period of each year. From Riparia up to Lewiston, Idaho, 71 miles, the Snake is now navigated practically all the year round. Lewiston is usually considered to be the present head of navigation on Snake River. From the foregoing it will be seen that the country bordering the Columbia from Celilo Falls up to Priest Rapids, and from the mouth of Snake River up to Lewiston, Idaho, would have water transportation at least during a portion of each year, except for the obstructions in the 12 miles between The Dalles, Oreg., and Celilo, Oreg.

### COMMERCE.

The country along and adjacent to the Columbia from Celilo up to Priest Rapids, also that along and adjacent to the Snake River up to Lewiston, is capable of producing very large quantities of wheat, and is also suitable for cattle and sheep raising. Wheat is now the chief product of the country. Such as is now raised is taken by rail to Portland and Seattle and exported to Europe and Asia. Were it possible for steamboats to be passed around the existing obstructions in the Columbia between The Dalles and Celilo, wheat could be brought from the wheat-growing districts of eastern Washington and Oregon and western Idaho, above referred to, direct to Portland by water, and there loaded in ocean vessels. This would undoubtedly materially reduce the cost of getting the wheat to the ocean vessels and also probably greatly increase the acreage, as transportation facilities would then be afforded sections which now have not even rail transportation.

These wheat-growing regions, including the fertile Palouse and Walla Walla countries of Washington and the Camas and Cold Spring prairies of Idaho, are chiefly the sources which have made Portland, Oreg., one of the principal wheat-exporting ports of the United States, and any improvement of the Columbia River that will give continuous water transportation from these localities to the sea may properly be regarded as of public importance.

### COST OF SURVEY.

It is estimated that the contemplated survey, with plans and estimates of cost of improvement, may be made for not to exceed $5,000, and it is proposed to pay the expenses, if the survey is authorized, from the previous appropriation for improving the Columbia River at Three-mile Rapids, Oregon and Washington, provided that course be deemed proper. The sum of $221,000, approximately, of former appropriations is still available.

Very respectfully, your obedient servant,

Wm. W. Harts,
*Captain, Corps of Engineers.*

Brig. Gen. John M. Wilson,
*Chief of Engineers, U. S. A.*
(Through the Division Engineer.)

[First indorsement.]

U. S. Engineer Office, Pacific Division,
*San Francisco, Cal., June 27, 1900.*

Respectfully forwarded to the Chief of Engineers.

The opinion of the district officer that the Columbia River between The Dalles Rapids and the head of Celilo Falls, Oregon and Washington, is worthy of improvement to the extent of making a survey with a view to the construction of a canal, or canals, and locks to overcome the obstructions to navigation is concurred in, and the estimate for said survey with plans, not to exceed $5,000, is recommended.

S. M. Mansfield,
*Colonel, Corps of Engineers,*
*Division Engineer.*

[Second indorsement.]

Office Chief of Engineers,
U. S. Army,
*July 7, 1900.*

Respectfully submitted to the Secretary of War.

This paper relates to preliminary examination authorized by the emergency river and harbor act approved June 6, 1900, as follows:

> Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington: with a view to the construction of a canal and locks to overcome the obstructions to navigation.

The locality is reported to be worthy of improvement to the extent of making a survey to determine the cost of the improvement proposed, and I recommend that a survey be made to that end, the expenses of said survey to be paid from the balance of appropriations available for improving Columbia River at this point.

John M. Wilson,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

[Third indorsement.]

War Department,
*July 9, 1900.*

Approved as recommended by the Chief of Engineers.

Elihu Root,
*Secretary of War.*

## SURVEY OF COLUMBIA RIVER BETWEEN THE FOOT OF THE DALLES RAPIDS AND THE HEAD OF CELILO FALLS, OREGON AND WASHINGTON, WITH A VIEW TO THE CONSTRUCTION OF CANALS AND LOCKS.

UNITED STATES ENGINEER OFFICE,
*Portland, Oreg., November 30, 1900.*

GENERAL: I have the honor to submit the following report, in compliance with the instructions contained in letter dated Office of the Chief of Engineers, United States Army, Washington, July 11, 1900, assigning to me the duty of making the survey of the Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington, with a view to overcoming the obstructions to navigation by means of canals and locks, as called for by the emergency river and harbor act of Congress approved June 6, 1900.

*Description.*—From Alaska on the north the Cascade Range of mountains extends parallel to the Pacific coast about 100 miles inland as far south as San Francisco Bay. This range of mountains offers an almost unbroken barrier to easy communication between the coast on the west and the wide productive regions of Idaho, eastern Oregon, and Washington lying between the Rocky and Cascade mountain ranges. From the international boundary line on the north, as far south as the Sacramento River, in California, the only important low break in the barrier formed by the Cascade Range is the Columbia River Valley. This valley offers the only natural line of communication between the Pacific coast and the country east of the Cascade Range where there is not involved a lift of several thousands of feet over these mountains. It thus affords an outlet for the products of the interior, which outlet will unquestionably always be the "line of the least resistance."

The geographical location of the Columbia River Valley and its exceptional advantages for a line of transportation have added to its natural importance in proportion as the country it drains has developed from an almost uninhabited wilderness to a productive and prosperous region. There appears much appropriateness in calling this interior region the "Inland Empire," by which name it is often known.

The Columbia River rises in the southwestern part of British Columbia, flows in a southerly and westerly direction through the State of Washington until it reaches the northern boundary of Oregon, and then flows westward for about 300 miles between the States of Oregon and Washington until it empties into the Pacific Ocean. This river, as is well known, is the greatest on the Pacific coast of North America, and, with its tributaries, drains an enormous area, much of which is mountainous country, estimated to contain 245,000 square miles, 182,000 square miles of which lie east of the Cascade Mountains. This latter area is about equal to the combined areas of all the New England States, including also New York, Pennsylvania, New Jersey, and Maryland. The drainage basin of the Columbia River stands second in the United States in point of size and commercial importance. It receives from the prairie regions of Idaho by way of the Snake River (which itself drains a vast area) the drainage from the Clearwater basin, from Cold Spring and Camas prairies, and from the other eastern prairie regions of Oregon and Idaho. From the Willamette Valley, in northwestern Oregon, it receives the drainage of another great area through the Willamette River. The drainage from the fertile regions of the eastern part of Washington and Oregon, including the Palouse and Walla Walla countries, reaches the Columbia through many smaller tributaries, among which are the Yakima, Des Chutes, Umatilla, and Walla Walla rivers. The largest of its tributaries, however, are the Snake and Willamette rivers.

The head waters of the Columbia and of the Snake, as well as of the greater number of their tributaries, are in the Rocky and Cascade mountains, which are usually covered throughout the greater part of the year with snow, and therefore the Columbia is subject to very high floods during each summer, caused by the melting of the snow in the mountains. These floods complicate the problem of navigation and increase the difficulties of improving these rivers. These changes in discharge occur with fair regularity, however, in point of time. Low water follows the harvest season, the lowest stages being usually in October and November. During the holidays there frequently occurs a "freeze-up" east of the Cascade Mountain Range, and in the early spring small rises follow; then comes the high water, usually commencing about April 15 and lasting ordinarily about two or three months.

*Navigation.*—From the ocean up to the mouth of the Willamette River, about 98 miles, the Columbia is navigated, even at its low stages, by ocean vessels drawing up to 20 feet of water. Portland, a city of over 90,000 inhabitants, is located about 12 miles up the Willamette River, or about 110 miles in all from the ocean, and is the main shipping port and commercial center of this region. From the mouth of the Willamette River up to Three-mile Rapids, 3 miles above the town of The Dalles, Oreg. (which latter place is on the Columbia 88 miles above the mouth of the Willamette), the Columbia is navigable, without difficulty, at all stages below extreme high water, for vessels drawing up to 8 feet. From Three-mile Rapids up to Celilo, Oreg., a distance of about 10 miles, all continuous navigation is interrupted at all stages by falls, rapids, and contracted channels through which the water is forced with great velocity. Above Celilo the river is again navigable for boats drawing 3½ to 4½ feet loaded (although with some difficulty at low-water stages on account of many rocks and shoals) up as far as Priest Rapids (in southeastern Washington), a farther distance of 198 miles; and Snake River, flowing into the Columbia at Ainsworth, Wash., is also navigable for light-draft boats as far as Asotin, Wash. (7 miles above Lewiston, Idaho), 146 miles above Ainsworth.

The Columbia for 10 miles below the mouth of the Snake and the Snake for about 53 miles above its mouth are now, however, so obstructed by shallow water and rocks and bowlder ledges as to be practically unnavigable at extreme low water, usually for a short period in the autumn, but with these exceptions navigation in the portions mentioned is not especially difficult. The opening to navigation of the 10 miles of the Columbia River, between Three-mile Rapids and Celilo would, therefore, give an unbroken length of about 540 miles of the Columbia and Snake rivers that could be navigated the greater part of each year, and thus provide water communication with tide water and furnish transportation facilities in regions that now have practically none. The Columbia River and its tributaries before the railways were built were for a great many years the only means of connection between the ocean and the interior regions tributary to these streams.

I am informed that in very early days the Oregon Steam Navigation Company operated a line of steamers from Portland to the obstructions in the Columbia River at "The Cascades," now known as Cascade Locks, Oregon (about 43 milesabove the mouth of the Willamette River), there transporting cargoes overland by a portage road, 6 miles long, around these obstructions. From Cascade Locks up to the town of The Dalles, about 45 miles, steamers were again used in what was then called the Middle River.

At The Dalles a second portage road, on the Oregon shore, about 13 miles long, transferred freight and passengers around the obstructions between Three-mile Rapids and Celilo to the "upper river," and there again vessels were taken for the Upper Columbia and Snake rivers. Later, upon the completion of the Portland-Spokane rail line of the Oregon Railroad and Navigation Company, practically paralleling the Columbia and Snake rivers between Portland and Riparia, Wash., the use by boats of the Columbia above Celilo and of the Snake below Riparia was materially diminished, so that at the present day the only navigation of either the Columbia or the Snake River above Celilo of any special importance is carried on along that portion of the Snake between Riparia and Lewiston, 73 miles, where a daily line of steamboats is still running, connecting with the Oregon Railroad and Navigation Company's rail line at Riparia and with the Spokane-Lewiston rail line of the Northern Pacific Railroad Company at Lewiston. The need for better commercial connection between the interior country and the coast has, however, grown materially in recent years on account of the great increase in the acreage of the wheat-producing regions and other tilled land and on account of the discoveries of gold, copper, and other valuable minerals in Idaho and eastern Oregon and Washington. The natural rapid development of the interior country has given the question of transportation facilities a decided importance.

The Columbia River was formerly obstructed at "The Cascades," about 43 miles above the mouth of the Willamette, by rapids over which vessels could not pass safely, and for many years the Government has been engaged in constructing a canal around these rapids, which canal, although in some respects still incomplete, was opened to navigation in November, 1896, so that the river may now be considered open to navigation from its mouth up to The Dalles, Oreg., a distance of 186 miles. The only remaining obstruction in the Columbia River below Priest Rapids that is insuperable at the present time for navigation is, as was before referred to, in the portion lying between The Dalles, Oreg., and Celilo, a stretch of about 13 miles, where all continuous navigation is interrupted at all stages.

As before stated, the river above Celilo is navigable for light-draft steamboats drawing, loaded, not over 4½ feet of water, although this navigation, especially at and near low-water stages, has always been carried on with some danger and difficulty, owing to the rapids and rocky bars that are encountered more or less frequently in the Columbia above Celilo and in the Snake between Ainsworth and Riparia. Improvement by the Government has been carried on for many years in these portions of the Columbia and Snake, materially lessening the difficulties of navigation.

Although the work of improving the Columbia from The Dalles to Priest Rapids and the Snake from Ainsworth to Lewiston so that navigation for light-draft steamboats may be provided during the greater portion of each year would be one of considerable magnitude, it would not involve any insurmountable difficulties from an engineering point of view. It would be mainly a question of expense.

The opening of the Columbia at "The Cascades" in 1896 by the partial completion of the canal and locks around the obstructions at that place has given an added reason for some improvement of the Columbia in the 13 miles between The Dalles and Celilo, so that the regions above The Dalles may be reached by an open river and thus permit these regions to get the benefit of water rates for freight.

*Obstructions.*—Much if not all of the areas of Idaho, Washington, and Oregon are believed to have been covered in some former geological age by successive layers of hot lava, which in cooling have formed the basaltic cliffs and the igneous rocks of various degrees of hardness now forming the greater part of the surface of these regions. These layers of basalt in some localities are said to be 4,000 feet thick. The Columbia River between The Dalles and Celilo has apparently been slowly cutting its way for centuries through what appear to be thick layers of hard basalt and andesite. The total low-water discharge of the river as computed from observations taken near this place during the survey just completed is 108,000 cubic feet per second, and the extreme high-water discharge is likewise computed to be 1,600,000 cubic feet per second. This discharge must all pass through the narrow and crooked channels worn in the volcanic rock between The Dalles and Celilo. These conditions combine to form complete obstructions to navigation of a very unusual nature.

In no part of the other 385 miles of the Columbia River between its mouth in the Pacific Ocean and Priest Rapids is anything like such a condition met with. These obstructions between The Dalles and Celilo consist of rapids, falls, and contracted channels, and may be divided into four parts or sections: First and uppermost, Celilo Falls, at Celilo, which has a fall of 50 feet, approximately, at low water, in a distance of about 3,000 feet, where the bed of the river is suddenly broken off and filled with rocky islands and ledges, over and between which the water rushes with great fierceness (see photograph No. 1). There is at one place at Celilo a sheer fall of 21 feet, approximately, making it absolutely impossible for any vessel to pass this point with safety at anything like low-water stages. Below Celilo Falls the next obstruction consists of what is known as Ten-mile Rapids (see photographs Nos. 2 and 3), where the whole volume of the river at low water passes through a narrow channel about 2,700 feet long, hemmed in on both sides by high banks of basaltic rock, nearly vertical, and from 200 to 300 feet apart. Behind one of these banks, however (on the Washington or north side), at stages about 20 feet above low water, there is a high-water channel, so that when the surface of the river is raised at this point to the extent of about 20 feet it spreads over a greater area, thus increasing its area of cross section and decreasing its slope and velocity.

Just below Ten-mile Rapids are a number of rocks which, although dangerous in their present condition for any use of the river by boats at this point, could, when found necessary, be removed at comparatively small expense, so as to cause but little trouble to vessels. A short distance farther down the river the third obstructions, and by all means the most serious of all, are what is known as Five-mile Rapids or the "Dalles" (see photographs Nos. 4, 5, 6, and 7), this word being said to mean "trough" or "mill race." Here, for the distance of about 9,000 feet, the total low-water discharge of the Columbia is forced between high banks of solid rock nearly vertical and in some places not over 160 feet apart, the low-water surface having a fall of 11.2 feet in this distance. The banks are solid basalt rock, precipitous, and from 40 to 60 feet high, and the bottom is a succession of pockets 40 to 60 feet deep. On account of the choked condition of the channel and the quantity of water forced through it the velocities are high and cross currents and eddies so serious that large vessels have never attempted to go up through these rapids even at most favorable stages. The remark is often made that this section of the river is "turned up on edge," and the conditions justify the use of such a description. This narrow portion of the river ends, at its lower end, in a whirlpool of great depth, known as "Big Eddy" (see photograph No. 13), where the river makes a bend at right angles to its course just above.

Along the Oregon or south side of this narrow portion of Five-mile Rapids for much of its length are found two natural high-water channels or canals (see photograph No. 7 for general view of both canals and photographs Nos. 8, 9, 10, 11, and 12 for details of the natural canal lying next south of the river) lying nearly parallel to the river. These natural channels offer advantageous sites for canals, and it is expected to utilize the one lying next south of the river in the system of canals proposed herein. About 1 mile below Big Eddy the fourth obstruction is met with, known as Three-mile Rapids (see photograph No. 14), where the channel is considerably obstructed and contracted at several places by islands and by rocky points extending from both the Oregon and Washington shores into the river. This last obstruction is the only one that seems to lend itself with any ease to improvement. It is believed that the removal of small portions of rock at several places along Three-mile Rapids will also remove the dangerous features of these rapids.

The condition of the four above-named obstructions has been described with regard to low-water stages. The problem of improvement, already extremely difficult on account of the natural conditions existing at low water, is vastly complicated by the change that takes place in this vicinity during high-water stages each summer. The total fall in the 9 miles of river from above Celilo Falls to quiet water below Big Eddy during the low-water stages is, approximately, 81 feet. The greater part of this fall during low water takes place at the upper end, at and near Celilo Falls. The fall throughout the remainder of the distance is not absolutely prohibitive of the use of it at extreme low water by vessels, provided the channel be somewhat widened and otherwise improved. As the water level rises, however, these conditions are reversed; the surface slope at Five-mile Rapids increases and that at Celilo Falls decreases, so that at high water the water surface at Celilo Falls has a slope of only about 3 feet to the mile instead of about 50 feet, whereas the fall at Five-mile Rapids increases from a total of 11.2 feet to the maximum of 35 feet, or from about 6.6 feet to the mile to 21 feet to the mile. These conditions are largely caused by the conformation of the banks above the bench that forms the low-water banks, causing at all stages a gorging of the water. (See profile map of water surface.[1])

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[1] Not printed.

Further detailed descriptions of the Columbia River and the obstructions between Celilo and The Dalles are contained in the Annual Report of the Chief of Engineers, United States Army, for 1882, Part III, pages 2690–2713; in House Ex. Doc. No. 73, Fiftieth Congress, second session, and in Senate Ex. Doc. No. 7, Fifty-third Congress, first session.

*Previous examinations and surveys.*—The first investigation of the obstructions between Celilo and The Dalles by the Government, made with a view to their improvement, was made in 1874 by Maj. N. Michler, Corps of Engineers, whose report is to be found in the Annual Report of the Chief of Engineers, United States Army, for 1875, Part II, page 787. The report of this examination was favorable for improvement, Major Michler reporting as follows:

> The importance of the proposed improvements can not be overestimated. The difficult problem of engineering which must be solved will, at least at one of the localities, The Dalles (Five-mile Rapids), at first study appear almost insurmountable. * * *

Later investigations were made by the Government under the direction of Congress in 1879, and a detailed and comprehensive survey, with a project for improvement, was made by Capt. (now Major) C. F. Powell, Corps of Engineers (report printed in Annual Report of the Chief of Engineers for 1882, Part III, p. 2690), which provided for use of the river at low-water stages from the town of The Dalles, Oreg., up as far as the foot of Celilo Falls by an open river without locks. The passage of Celilo Falls was provided for by a canal and locks on the Washington bank. This project required the excavation of much rock in the open-river portion in widening and straightening the channel from The Dalles up to Celilo Falls. The estimate of cost of this project was $7,674,495.51. A supplementary project, permitting the use of the river during high stages, was included, requiring $2,842,848.20 additional, or a total of $10,517,343.71 for improvement for all boating stages. Major Powell in his report stated as follows:

> The Columbia is the great river on the Pacific coast. In volume and commercial value it is second only to the Mississippi. Its banks are more stable, its waters are more clear, its ice blockades are much less in duration than on the great waterway of the East. Unlike the Mississippi, the Columbia seeks the ocean on a line parallel to trade channels and not at right angles to them.

The high cost of this plan of improvement, however, probably induced Congress to order further investigation, and in 1888 a Board of Engineer Officers was convened to report upon the feasibility of a plan selected by Congress of overcoming these obstructions by means of a boat railway, by which vessels were to be removed entirely from the water by vertical hydraulic lifts, the one at one end 77 feet high and the one at the other end 62 feet high, the boats to be transported on a car over a broad-gauge track, about 9 miles long, around the obstructions, and then returned to the river by the lift at the other end. This report, submitted in 1890, was favorable, and the cost was estimated at $2,860,356.35, or nearly $3,000,000. A portage road around the obstructions, constructed and operated by the Government free of cost to shippers, was recommended by the Board for immediate relief, the boat railway not to be put in until requirements of navigation demanded (House Ex. Doc. No. 64, Fifty-first Congress, first session[1]).

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[1] Also printed in the Annual Report of the Chief of Engineers for 1890, page 3028.

In 1892 a second Board was convened to reconsider these plans. It submitted a report under date of April 12, 1893 (printed in Senate Ex. Doc. No. 7, Fifty-third Congress, first session[1]), recommending the construction of a free portage road first and the construction of a canal with locks as a later and more permanent improvement, to be built when found necessary to meet the demands of navigation. A portion of this Board, however, submitted a minority report, recommending a boat railway, practically as embodied in the previous report of 1890. Congress, apparently acting on the recommendation of this minority report, appropriated, on August 18, 1894, $100,000, and on June 3, 1896, $150,000 for the construction of this boat railway without making any provision for the construction of a free portage railway. Preliminary work connected with the boat railway was started promptly, the acquisition by the United States of right of way being the first step. Condemnation proceedings were instituted in some cases, and in others the land was acquired by direct purchase. Preliminary plans have been prepared, the ground surveyed, and the line of the proposed railway carefully laid out. Actual construction of the boat railway has been delayed, however, pending the time when full right of way, which has not yet all been obtained, could be secured, further action by Congress being first necessary in order to effect an exchange of land belonging to the United States for land belonging to the Oregon Railroad and Navigation Company.

Many objections have, however, arisen among river men to any scheme for improvement of this section of the river by which their vessels are to be removed from the river and carried about 9 miles overland on a railway, and others have objected on the ground that the estimated first cost and the difficulties of maintenance and operation of a boat railway would likely be found greater in practice, no such boat railway having ever been successfully operated, the plan being as yet only experimental. It is also maintained by some that any device that removes a vessel from its proper element and carries it on a car over a track 9 miles long, which necessarily has both vertical and horizontal curves, would, in the case of the light-draft river vessels used in shallow streams, likely expose them to serious twisting and probable damage, especially if not carefully loaded. It has even been asserted that those especially interested in delaying as much as possible any adequate improvement of this part of the river for personal reasons were outwardly much in favor of a boat railway, as they believed the plan impracticable, and therefore not likely to be successfully completed.

*Present survey.*—This locality having been surveyed carefully in 1879–80 under Maj. C. F. Powell, Corps of Engineers, the present survey has had for its main object obtaining certain further, more definite information and checking the old maps for any changes that might have taken place since that date. The time available for this present survey being too short for the observation of gauge readings and of changes in water levels necessarily extending over a large part of a year, and this data being already at hand as obtained in the survey of 1880, with no special need of duplication, the water-level observations of this previous survey have been used for this project, modified in some minor particulars by the observations of the present survey. A careful topographical survey of the proposed canal sites was made with a view to obtaining the most advisable locations and to determine the quantity and kind of excavation necessary.

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[1] Also printed in the Annual Report of the Chief of Engineers for 1894, page 2664.

Fifteen photographs[1] of the locality and tracings of the following 10 maps accompany this report.

Map of Columbia River from The Dalles to Celilo, in three sheets; scale, 1=6,000.

Plan of the canal site at Five-mile Rapids; scale, 1=1,200.[1]

Profile of the canal site at Five-mile Rapids.[2]

Plan of the canal site at Celilo Falls; scale, 1=1,200.[1]

Profile of canal site at Celilo Falls.[2]

Profile of water surface at different stages.[2]

General plan of the lock chamber of the Celilo Canal.[2]

General plan of the lock chamber of the Five-mile Rapids Canal.[2]

Details of gates.[2]

Details of the lock masonry and valves.[2]

The present survey was commenced late in July, 1900, under charge of Mr. Philip G. Eastwick, with a party of 15 men, and was completed October 15, 1900.

*Proposed plan of improvement.*—Briefly stated, the proposed project for improvement now submitted provides for abandoning the previous boat railway project and for substituting the following: First, the construction of a canal about 3,000 feet long, with two lift locks of about 24 feet lift each, extending across the peninsula on the Washington shore in the vicinity of Celilo Falls; second, the removal of the worst obstructing rocks at and below Ten-mile Rapids and the opening of a relief channel along the line of the existing high-water channel on the Washington shore immediately north of and parallel to Ten-mile Rapids third, the construction of a canal about 9,000 feet long around Five-mile Rapids, having two locks (one of 33 feet lift and one to be used as a guard lock, for use during high stages), this canal to be along the Oregon shore, its lower end opening immediately below Big Eddy and its upper end to be immediately above the head of Five-mile Rapids, utilizing for this canal, as far as practicable, the more northerly of the two natural high-water canals or channels which now parallel, on the south, the greater portion of Five-mile Rapids; fourth, the construction of a submerged dam or weir immediately below the head of Five-mile Rapids which will raise the present level of the low-water surface approximately 20 feet, thus drowning out the rapids between this dam and Celilo Falls and reducing the currents in the river between the canal around Five-mile Rapids and that around Celilo Falls, especially at low stages, by increasing the area of the cross section of discharge and diminishing the surface slope; fifth, the removal of the worst obstructing rocks at Three-mile Rapids.

The canals around Celilo Falls and Five-mile Rapids could be used, according to the design submitted, from low-water stages up to a stage where the lower gauge at Cascade Locks registers 38 feet above low water, this being the limit beyond which no vessels have ever been able to ascend the rapids just below, and enter the canal at Cascade Locks, and beyond which, therefore, no continuous navigation above Cascade Locks would be of sufficient importance to be considered. The water surface at this stage is therefore taken as the upper "limit of navigation." As the water rises from low stages the lower locks in both canals would be "drowned out." In this case only the upper locks would be used, the lower gates being left open and submerged up to the limit of navigation. At all stages above this upper limit the canals and locks would all be left to be flooded, but after the water subsided to below a point where the locks may first be used navigation would not be interrupted. The period each year when the use of these proposed locks around Celilo Falls and Five-mile Rapids would be thus suspended by reason of high water would be, from observation of fifteen years (from 1878–1893) at Cascade Locks, on an average of not over twenty days per year. Four years during this interval the stage of water has not reached the point where a total suspension of the use of the proposed canals would have been necessary. At such high-water periods as would necessitate total suspension of navigation through the two proposed canals it is believed all practicable navigation above Celilo would also be interrupted on account of swift currents and other difficulties due to high water.

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[1] Not reprinted; printed in House Doc. No. 228, Fifty-sixth Congress, second session.

[2] Not printed.

These proposed canals are designed to be 65 feet wide on the bottom, cut through solid rock with the natural condition of the sides as left after blasting, but protected by wooden fenders wherever needed to prevent injury to vessels. These rock sides would have, approximately, a slope of 4 on 1. It is proposed that the locks themselves shall have an effective width of 54 feet at the gates, a length of 300 feet between hollow quoins, and a clear depth of 7 feet over the miter sills. The size of the locks was determined by the dimensions of the largest steamer ever used on the upper portion of the Columbia River and on Snake River, being the *Fred. K. Billings*, which is said to be 200 feet long and 36 feet 9 inches beam. Steamboat masters claim that no flat-bottom, light-draft vessel of over 40 feet beam can ever successfully stem the swift currents of the Snake River and the Columbia above Celilo, the usual dimensions of the boats that have been successfully operated being as follows:

| | Hull length. | | Beam. | | Depth. | | Draft, light. | | Draft, loaded. | | Net tonnage. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Ft.* | *in.* | *Ft.* | *in.* | *Ft.* | *in.* | *Ft.* | *in.* | *Ft.* | *in.* | |
| **Spokane** | 160 | 4 | 38 | 6 | 6 | 3 | 2 | 00 | 3 | 8 | 408 |
| **Lewiston** | 165 | 0 | 34 | 4 | 5 | 3 | 1 | 10 | 3 | 6 | 487 |
| **Almota** | 157 | 0 | 36 | 0 | 5 | 0 | 1 | 8 | 3 | 6 | 395 |
| **Norma** | 160 | 0 | 32 | 6 | 5 | 6 | 1 | 11 | 3 | 4 | 452 |
| **Harvest Queen**[1] | 200 | 0 | 37 | 0 | 7 | 5 | 4 | 6 | 7 | 0 | 697 |
| **D. S. Baker**[1] | 165 | 0 | 36 | 3 | 5 | 0 | 3 | 6 | 6 | 0 | 566 |
| **J. M. Hannaford** | 169 | 0 | 36 | 4 | 5 | 5 | 2 | 3 | 3 | 9 | 444 |
| **Thomas L. Nixon**[1] | 158 | 6 | 36 | 1 | 5 | 8 | ........ | | ........ | | 477 |
| **Fred. K. Billings**[1] | 200 | 0 | 36 | 9 | 5 | 0 | ........ | | ........ | | 677 |

[1] Out of service.

The depth over the miter sills (7 feet) and the depth in the canals at low water (7 feet) is designed to allow their use by vessels of 4½ to 5 feet draft in the canals at a speed of about 6 or 7 miles per hour. Although this depth is a foot or so greater than the present size of boats demand, it is believed to be advisable, in order to save delay at low stages, to have ample space beneath vessels in the locks and to have some room for future increase of draft. Separate lockage would be required for each vessel, each proposed canal having a capacity of, approximately, one vessel every forty minutes, or a maximum of 36 vessels every twenty-four hours. All proposed locks consist of the solid basalt rock for sides, having only a short length of wall of concrete in the vicinity of the gates sufficient to take up and transmit to the rock sides the strain of the water pressure on the gates, to provide space for the necessary apparatus for opening and closing the gates, and space necessary for the filling and emptying culverts of the locks. The locks are designed to be filled through culverts in the breast or lift wall, but the lowest lock in each canal is to be emptied by culverts around the lower gates. An extra iron-pipe culvert along one side of each flight of locks is provided to equalize the water levels when needed in making lockages at certain stages and to secure means for obtaining power should it be needed later for operating the valves and gates or for electric lights.

All gates of both canals are designed to be made of steel. It is proposed that they shall be constructed on the system of horizontal framing, as it is believed in this way the varying water pressures can be better met, providing as it does for a proper distribution of the girders and flange areas. The gates are designed with flat backs, as the greater ease of constructing them will more than compensate in cost of construction for the lighter curved-back steel gates. In no part of the proposed gates is a less factor of safety than 6 allowed. The lock gates and valves are designed to be operated by hand power, but the substitution of electric or hydraulic operating mechanism may, if found more desirable upon further study, be put in at a small additional cost. The lock valves proposed are of the butterfly pattern, with vertical shafts, and are all suspended, the weight being borne on ball-bearing collars near the tops of the valves. The lock valves are designed to be removable to the top of the wall in case of damage without special difficulty, and coffer slots are devised therefor. Guard gates to enable repairs to be made to the lock gates are also included in the project. Double entrances to filling culverts are designed to prevent delays due to accidents and to allow a greater flow when required for sluicing the canal to clear it of sediment.

The proposed submerged dam immediately below the head of Five-mile Rapids is designed to be made throughout of large blocks of rock or concrete weighing 20 to 30 tons, each deposited at random in a selected narrow part of Five-mile Rapids by means of derricks on either shore. If found necessary on account of the swift currents some of the blocks could be anchored to the rocky banks by means of chains. The dam need not necessarily be tight, but should consist of enough blocks to raise the present low-water level 20 feet. Its top would probably need to rise to within a few feet of the present low-water level.

For the canal around Five-mile Rapids walls made of the loose rock excavated from the canal itself and faced with uncoursed masonry 3 feet thick are to be placed in all low places on both sides of the canal above the upper lock, so that no large volume of water shall enter the canal or escape except at the ends until the stage of water is above that corresponding to a rise of 38 feet at Cascade Locks gauge No. 2, or until navigation is suspended at both Cascade Locks and the proposed canal around Five-mile Rapids. Walls are also placed in the design on the river side along the lower portion of the canal below the locks, so that no water from the river shall enter the canal during boating stages except at its lower end.

Similar walls are provided for along the river side of the Celilo Falls Canal. These walls are necessary to prevent undue currents and to permit the canals to be used at all the stages for which designed. The submerged dam immediately below the head of Five-mile Rapids, in addition to "drowning out" the Ten-mile Rapids and removing its dangerous features, will permit the bottom of the upper portion of the proposed Five-mile Rapids Canal to be 20 feet higher than if it were not used, thus reducing materially the amount of excavation which would otherwise be necessary. It is computed that this submerged dam will affect the water levels less than 1 foot at high-water stages. Two chambers to permit vessels to pass each other, one just above the locks and one just below, are provided in the Five-mile Rapids Canal, such a provision in the short length of the upper canal being unnecessary. The sites selected require few curves of low curvatures and, it is believed, give the most economical locations.

The amount of work now deemed necessary at Ten-mile Rapids has been based upon the best information now available. Further observation and close study of the water surfaces, requiring more time than can now be devoted to this purpose, may reduce somewhat the present estimated quantity of work needed.

Maps showing the plan and profile of each canal and a profile of water slopes at different stages are forwarded herewith.

This proposed plan for canals has the advantage of simplicity, requiring no summit-level and feeder canal, as does that of previous projects, but supplies itself from the river. Also the number of locks required in previous plans is reduced, the time of passage shortened, and capacity increased. The use of a dam or submerged weir, made by placing enough large concrete or basaltic blocks in a selected place near the head of Five-mile Rapids to raise the low-water level about 20 feet, would diminish the amount of excavation necessary in constructing the canal around Five-mile Rapids, and would render harmless the intermediate rapids and rocks in the stretch of river between this proposed canal and the one proposed around Celilo Falls. It is intended that the rock excavated in constructing the canals shall be used, as far as needed, in building protecting walls along the canals, whereas the locks themselves, instead of the usual expensive masonry construction, are believed to be the simplest and cheapest consistent with good practice.

An objection might be raised that the submerged dam near the head of Five-mile Rapids will interfere with the salmon in reaching their spawning grounds, thus injuring the fishing industry of the Columbia River; but this can not properly be maintained, as the top of the proposed dam is lower than the present ordinary low-water surface at this place, and it is believed that no worse condition for fish would be created than now exists at Celilo Falls. It has also been feared that the drifting sand of this locality, so annoying to the Oregon Railroad and Navigation Company, whose railroad parallels the river on the Oregon shore, might cause trouble by filling up the canals; but this is provided against by double culverts opening in the locks and an extra iron-pipe culvert, thus enabling the canals to be sluiced, as is now the practice at the canal at Cascade Locks when it becomes necessary to remove sediment that drifts into it. At the present proposed locations for the canals, however, there is now no drifting sand, and but little present likelihood of trouble on this score.

It is estimated that this project for canals may be completed within five years after acquiring rights of way if funds are made available as fast as required by the needs of the work or if contracts for total work or large portions of it are permitted. No difficulties of construction are contemplated other than those usually encountered in any work of this magnitude.

*Estimate.*—The prices of this estimate are based partly on the recent experience of the Government in the construction of Cascade Locks, partly on present railway work near the locality of the proposed canals, and partly on other information believed to be reliable. Rock excavation in small quantities is now done on railway cuts in eastern Oregon for from 60 to 85 cents per cubic yard at present prices of labor and explosives. By far the greater part of the rock excavation of the Chicago Drainage Canal was done at prices varying from 70 to 80 cents per cubic yard. The rough dressing of the faces and bottom of the Five-mile Rapids and Celilo Falls Canal would cost a small additional amount, so that the estimated cost of 95 cents per cubic yard for rock excavation is believed to be ample for this work.

The rock is a very hard, seamy basalt, difficult to drill, but easy to blast. The columnar structure and vertical cleavage of this basalt should make the finishing of the canal sides and bottom one of less difficulty than would be found in other kinds of hard rock. Concrete at Cascade Locks under a recent contract cost $6.25 per cubic yard, and I am informed recently built railway work in eastern Oregon cost approximately the same. In fortifications on Puget Sound mass concrete costs less than $5 per cubic yard, including forms. At Fort Stevens, in 1898, the cost was $5.85 per cubic yard. At the present time higher prices for labor and cement would make concrete cost somewhat more than this fortification work. Owing to the comparatively large quantities needed at each of the two proposed canals the price of concrete has been estimated at $7 per cubic yard. Steel for the Cascade Locks gates in 1895–96 cost $6\frac{5}{8}$ cents per pound for the structural steel in Maryland, $1\frac{1}{16}$ cents for freight to Cascade Locks, and one-half cent per pound for erection, making a total of $8\frac{3}{16}$ cents per pound in place. The recent construction of a steel movable dam at the upper entrance of the canal cost 8 cents per pound delivered at Cascade Locks and $1\frac{1}{2}$ cents for erection, making the total cost $9\frac{1}{2}$ cents per pound in place. The price of steel has advanced recently, but it is believed that 12 cents per pound is sufficient now to cover the present proposed work.

The estimate is further based on the assumption that funds will be available as fast as needed by the construction and that contracts for the whole or for large portions of the work, such as the entire excavation, could be made at one time. But if this work must be done under small or infrequent appropriations the cost will certainly be much increased.

The estimate of cost of the project above outlined is as follows:

*Estimate of cost.*

CELILO FALLS CANAL AND LOCKS.

| | | |
|---|---|---|
| Excavation, canal trunk: | | |
| Solid rock, above low water, 278,900 cubic yards, at 95 cents per cubic yard | $264,955 | |
| Solid rock, submerged, 4,300 cubic yards, at $10 per cubic yard | 43,000 | |
| Gravel, 95,100 cubic yards, at 35 cents per cubic yard | 33,285 | |
| Side protection walls: | | |
| Overhaul in placing in walls, waste rock from canal excavation, 50,200 cubic yards, at 20 cents per cubic yard | 10,040 | |
| Rubble facing in mortar, 3,906 cubic yards, at $4 per cubic yard | 15,624 | |
| Total for excavation, etc | | $366,904 |
| Locks: | | |
| Upper guard gates (each leaf 31 feet long by 25 feet high), one pair, 205,200 pounds steel, at 12 cents per pound | 24,624 | |
| Pintles, mountings, connections to masonry, and anchorages | 6,812 | |
| Upper lock gates (each leaf 31 feet long by 25 feet high), one pair, 205,200 pounds steel, at 12 cents per pound | 24,624 | |
| Pintles, mountings, and anchorages | 6,812 | |
| Filling culvert valves and maneuvering appliances | 14,565 | |
| Masonry at upper gates, 14,338 cubic yards concrete, at $7 per cubic yard | 100,366 | |
| Total at upper gates | 177,803 | |
| Middle gates (each leaf 31 feet long by 49 feet high), one pair, 455,800 pounds steel, at 12 cents per pound | 54,696 | |
| Pintles, mountings, and anchorages | 12,887 | |
| Filling culvert valves and maneuvering appliances | 14,212 | |
| Masonry at middle gates, 15,693 cubic yards concrete, at $7 per cubic yard | 109,851 | |
| Total at middle gates | 191,646 | |
| Lower lock gates (each leaf 31 feet long by 39 feet high), one pair, 362,000 pounds steel, at 12 cents per pound | 43,440 | |
| Pintles, mountings, and anchorages | 10,763 | |
| Lower guard gates (each leaf 31 feet long by 29 feet high), one pair, 241,600 pounds steel, at 12 cents per pound | 28,992 | |
| Pintles, mountings, and anchorages | 7,265 | |
| Filling culvert valves and maneuvering appliances | 14,565 | |
| Masonry at lower gates, 14,690 cubic yards concrete, at $7 per cubic yard | 102,830 | |
| Total at lower gates | 207,855 | |
| Lock-chamber walls between upper and middle gates, 1,450 cubic yards concrete, at $7 per cubic yard | 10,150 | |
| Extra filling culvert (available for power): | | |
| Cast-iron pipe, 60 inches in diameter, 715,700 pounds, at 3 cents per pound | 21,471 | |
| Three gate valves for same | 6,000 | |
| Turbine, penstock, etc | 3,200 | |
| | 30,671 | |
| Total for all lock masonry and metal work | | 618,125 |
| Shop, store buildings, and tools | | 10,000 |
| Quarters for lock hands, 3 sets, at $2,000 each | | 6,000 |
| Fenders and range signals | | 9,000 |
| Engineering, inspection, and contingencies | | 202,005 |
| Total for Celilo Falls Canal | | 1,212,034 |

### TEN-MILE RAPIDS.

Enlarging relief channel on Washington bank, to be 150 feet wide on the bottom and 3 feet deep at low water, produced by proposed submerged dam near head of Five-mile Rapids (elevation of bottom of channel 39 feet above survey datum). Side slopes 1 on 2 in gravel, vertical in rock.

| Station. | Depth of cut. | Location. | Character of bottom. | Cubic yards. |
|---|---|---|---|---|
| | *Feet.* | | | |
| 0—300 | 10 | Commencing at low-water line in river at upper end across gravel bar to point in pond near shore. | Gravel | 164,900 |
| 300—1300 | 19 | | | |
| 1300—1600 | 16 | | | |
| 1600—3300 | 8 | Through widest pond | Gravel | 51,600 |
| | | | Rock | 30,000 |
| Near 1900 | 22 | Widening narrows in pond | Rock | 9,800 |
| 3300—3400 | 16 | Cut into small pond | Gravel | 2,000 |
| 3400—3550 | 10 | | | |
| 3550—3650 | 15 | Between small and long pond | Gravel | 5,000 |
| | | | Rock | 5,000 |
| 3650—7250 | 6 | Through long pond | Rock | 155,500 |
| 7250—7550 | 17 | Across lower gravel bar into the river | Gravel | 165,100 |
| 7550—8800 | 14 | | | |
| 8800—9200 | 7 | | | |
| | | Total | Rock | 200,300 |
| | | Total | Gravel | 388,600 |

Estimate of cost:

| | |
|---|---|
| Excavation, gravel, 388,600 cubic yards, at 25 cents per cubic yard | $97,150 |
| Excavation, rock above low water, 200,300 cubic yards, at 95 cents per cubic yard | 190,285 |
| Total for relief channel | $287,435 |

*Removing rocky points below Ten-mile Rapids near station △ 25 R to 10 feet below present low water.*

| No. on map. | Location. | Cubic yards above low water. | Cubic yards below low water. |
|---|---|---|---|
| 9 | Lower point of island | 2,500 | 3,700 |
| 10 | Cluster of rocks | 1,100 | 2,600 |
| 11 | Upper point of island | 1,050 | 2,200 |
| 12 | Small island near △ 25 R | 2,050 | 2,970 |
| | Total | 6,700 | 11,470 |

Estimate of cost:

| | | |
|---|---|---|
| Excavation, rock, 6,700 cubic yards above low water, at 95 cents per cubic yard | $6,365 | |
| Excavation, rock, 11,470 cubic yards below low water, at $4 per cubic yard | 45,880 | |
| Total | | $52,245 |
| Engineering, inspection, and contingencies | | 67,876 |
| Total for Ten-mile Rapids | | 407,556 |

### FIVE-MILE RAPIDS CANAL AND LOCKS.

| | | |
|---|---|---|
| Excavation, canal trunk: | | |
| Solid rock above low water, 717,500 cubic yards, at 95 cents per cubic yard | $681,625 | |
| Rock, submerged, 7,400 cubic yards, at $10 per cubic yard | 74,000 | |
| Solid rock below low water that can be excavated dry by pumping, 25,300 cubic yards, at $2.50 per cubic yard | 63,250 | |
| Side protection walls: | | |
| Overhaul in placing in walls 151,900 cubic yards waste rock from canal, at 20 cents per cubic yard | 30,380 | |
| Rubble facing in mortar 18,200 cubic yards, at $4 per cubic yard | 72,800 | |
| Total for excavation, etc | | 922,055 |

| | | |
|---|---|---|
| Locks: | | |
| Upper guard gates (each leaf 31 feet long by 25 feet high), one pair, 210,000 pounds steel, at 12 cents per pound | $25,200 | |
| Pintles, mountings, and anchorages | 6,812 | |
| Upper lock gates (each leaf 31 feet long by 55 feet high), one pair, 535,200 pounds steel, at 12 cents per pound | 64,224 | |
| Pintles, mountings, and anchorages | 13,985 | |
| Filling culvert valves and maneuvering appliances | 15,477 | |
| Lock masonry, upper gates, 15,810 cubic yards concrete, at $7 per cubic yard | 110,670 | |
| Total at upper gates | 236,368 | |
| Middle gates (each leaf 31 feet long by 55 feet high), one pair, 535,200 pounds steel, at 12 cents per pound | 64,224 | |
| Pintles, mountings, and anchorages | 13,985 | |
| Filling culvert valves and maneuvering appliances | 15,124 | |
| Lock masonry at middle gates, 16,720 cubic yards concrete, at $7 per cubic yard | 117,040 | |
| Total at middle gates | 210,373 | |
| Lower lock gates (each leaf 31 feet long by 51½ feet high), one pair, 515,400 pounds steel, at 12 cents per pound | 61,848 | |
| Pintles, mountings, and anchorages | 13,348 | |
| Lower guard gates (each leaf 31 feet long by 25 feet high), one pair, 210,200 pounds steel, at 12 cents per pound | 25,224 | |
| Pintles, mountings, and anchorages | 6,812 | |
| Filling culvert valves and maneuvering appliances | 15,477 | |
| Lock masonry of lower gates, 15,422 cubic yards of concrete, at $7 per cubic yard | 107,954 | |
| Total at lower gates | 230,663 | |
| Lock chamber walls between upper and middle gates, 2,311 cubic yards concrete, at $7 per cubic yard | 16,177 | |
| Extra filling culverts (available for power), cast-iron pipe, 60 inches in diameter, 715,700 pounds, at 3 cents per pound | 21,471 | |
| Three gate valves for same | 6,000 | |
| Turbine, penstock, etc | 3,200 | |
| | 30,671 | |
| Total for all lock masonry and metal work | | $724,252 |
| Dam at the head of Five-mile Rapids, including cost of anchoring by chains 6,300 cubic yards concrete blocks in place, at $14 per cubic yard | | 88,200 |
| Shops, store buildings, and tools | | 15,000 |
| Quarters for lock hands, 4 sets, at $2,000 each | | 8,000 |
| Fenders and range signals | | 32,000 |
| Engineering, inspection, and contingencies | | 357,826 |
| Total for Five-mile Rapids Canal | | 2,147,333 |

### THREE-MILE RAPIDS.

*Removal of rock at special places to a depth of 10 feet below low water.*

| No. on map. | Location. | Cubic yards above low water. | Cubic yards below low water. | Cubic yards subaqueous. |
|---|---|---|---|---|
| 1 | Isolated rock near △ 51 R | 300 | 1,200 | |
| 2 | Isolated rock near △ 50 R | 1,040 | 1,600 | |
| 3 | Submerged rock opposite △ 49 L | | | 1,400 |
| 4 | Rock and submerged reef | 400 | 800 | 3,200 |
| 5 | Portion of island | 5,000 | 6,000 | |
| 6 | Point of rocks at M | 8,000 | 5,000 | |
| 7 | Island opposite △ 45 L | 5,000 | 3,000 | |
| 8 | Point near △ 45 L | 2,800 | 1,900 | |
| | Total | 22,540 | 19,500 | 4,600 |

Estimate of cost:

| | | |
|---|---|---|
| Rock excavation, 22,540 cubic yards above low water, at $1 per cubic yard | $22,540 | |
| Rock excavation, 19,500 cubic yards below level of low water, but with a cap above high water to work from, at $3 per cubic yard | 58,500 | |
| Subaqueous, 4,600 cubic yards, at $10 per cubic yard | 46,000 | |
| Engineering, inspection, and contingencies | 25,408 | |
| Total for Three-mile Rapids | | $152,448 |

SUMMARY OF COST.

| | |
|---|---|
| Celilo Falls canal and locks | $1,212,034 |
| Improvement of Ten-mile Rapids | 407,556 |
| Five-mile Rapids Canal, locks, and submerged dam | 2,147,333 |
| Improvement of Three-mile Rapids | 152,448 |
| Land and rights of way at all points necessary | 50,000 |
| Total | 3,969,371 |

*Commercial importance.*—The area of productive country believed to be affected to a greater or less degree by the improvement of the Columbia River between The Dalles and Celilo so as to provide an "open river" includes the following districts:

1. Lewiston district, embracing over 2,000,000 acres, including Wallowa County, Oreg., Asotin County, Wash., and all of Nez Perce, Latah, and Idaho counties and part of Shoshone County, Idaho.
2. Palouse or Colfax district, including Whitman County, Wash.
3. Big Bend or Spokane district, including Spokane, Lincoln, Douglas, Adams, and Franklin counties, Wash.
4. Walla Walla district, including Walla Walla, Garfield, and Columbia counties, Wash.
5. Yakima Valley, including Yakima and Kittitas counties, Wash.
6. Pendleton district, including Umatilla and Morrow counties, Oreg.
7. The Dalles district, including Sherman, Wasco, and Gilliam counties, Oreg., and Klickitat County, Wash.

The actual production of these districts for 1900 has been compiled at my request and furnished me by the several local commercial organizations in many cases. A committee of the Commercial Club of Lewiston, Idaho, Mr. E. H. Libby, chairman, has collected and submitted the remainder. These statistics cover only the principal articles of production. Hops, of which Oregon alone produced in 1898 64,340 bales, potatoes, sugar beets, and dairy products, besides many others, have been omitted, so that the list can not be claimed as complete, although it is considered reasonably reliable as far as given. The cereals produced in the Columbia and Snake River valleys in 1900 have been variously estimated, in published crop reports, from 40,000,000 to 44,000,000 bushels, so that the figures for grain given below appear conservative. The prices used in obtaining values were taken partly from the report of the United States Department of Agriculture for 1899 and partly from other sources believed to be reliable.

| | Lewiston. | Palouse. | Big Bend. | Walla Walla. | Yakima. |
|---|---|---|---|---|---|
| Acres tillable | 2,200,000 | 1,105,000 | 2,500,000 | 724,400 | 800,000 |
| Acres cultivated | 375,000 | 650,000 | 800,000 | 593,400 | 75,987 |
| Wheat ... bushels | 5,450,000 | 6,000,000 | 4,000,000 | 8,667,000 | 500,000 |
| Oats ... do | 1,120,000 | 300,000 | 1,000,000 | 963,000 | 90,000 |
| Barley ... do | | 400,000 | | | ......... |
| Flax ... do | 284,000 | ......... | ......... | ......... | ......... |
| Cattle and horses ... number | 19,090 | 10,100 | 20,000 | 9,000 | 7,500 |
| Sheep and hogs ... do | 55,730 | 8,500 | 130,000 | 65,000 | 30,100 |
| Fruit ... cars | 490 | 500 | 280 | 750 | 739 |
| Wool ... pounds | 1,500,000 | 600,000 | 1,000,000 | 1,350,000 | 1,500,000 |
| Hides ... do | 580,000 | 125,000 | 500,000 | 200,000 | 300,000 |
| Hay ... tons | 45,000 | 50,000 | 65,000 | 40,000 | 51,000 |
| Increase in 5 years ending with 1900: | | | | | |
| Grain ... per cent | 1,900 | Slight. | 100 | 25 | 20 |
| Live stock ... do | 100 | 30 | 200 | 10 | 17 |
| Fruit ... do | 500 | 300 | 250 | 200 | 200 |
| Wool and hides ... do | 100 | ......... | 200 | 10 | 12 |

| | Pendleton. | The Dalles. | Total. | Estimated value. |
|---|---|---|---|---|
| Acres tillable | 1,210,000 | 1,100,000 | 9,639,400 | ......... |
| Acres cultivated | 850,000 | 621,850 | 3,966,237 | ......... |
| Wheat ... bushels | 5,400,000 | 4,750,000 | 34,767,000 | $17,383,500 |
| Oats ... do | 100,000 | 90,000 | 4,803,000 | 1,921,200 |
| Barley ... do | 340,000 | 400,000 | | |
| Flax ... do | ......... | ......... | 284,000 | 284,000 |
| Cattle and horses ... number | 9,200 | 9,000 | 83,890 | 1,677,800 |
| Sheep and hogs ... do | 111,000 | 121,000 | 521,330 | 1,563,990 |
| Fruit ... cars | 350 | 500 | 3,609 | 1,263,150 |
| Wool ... pounds | 3,347,000 | 7,500,000 | 16,797,000 | 1,679,700 |
| Hides ... do | 300,000 | 400,000 | 2,405,000 | 360,750 |
| Hay ... tons | 70,000 | 46,000 | 367,000 | 2,202,000 |
| Value of estimated total production of above items during year 1900 | ......... | ......... | ......... | 28,336,090 |

In addition to the foregoing there is said to be much valuable timber in the Clearwater River Valley. The white pine now standing in this valley is estimated by the Lewiston Commercial Club at 2,700,000,000 feet, lumber measure, and is said to cover 270,000 acres. In the Grande Ronde Valley, in eastern Oregon, there is likewise said to be 250,000 acres of yellow pine standing, amounting to 2,500,000,000 feet, lumber measure, of merchantable lumber. The gold and copper mines in Idaho and eastern Washington and Oregon are said to be valuable and productive, the gold belt of eastern Oregon alone producing $2,225,000 in 1899, and the Cœur d'Alene district of Shoshone County, Idaho, having the largest lead-silver mines in the United States. The development of valuable copper mines in the Seven Devils district, along the Snake River between Lewiston, Idaho, and Huntington, Oreg., is said to be awaiting transportation facilities.

It can be scarcely estimated with any great accuracy what proportion of the above-named products of this area would use water transportation if there were improved river facilities available.

Navigation in the Columbia River being completely obstructed at all stages in the 13 miles between The Dalles and Celilo, there is now no commerce carried on that portion of the stream lying between The Dalles and Priest Rapids. It is asserted, however, by those interested, and apparently with some reason, that as soon as these obstructions are removed or obviated there will inevitably spring up an important and increasing traffic between the interior regions and tide water, as there would thus in effect be created a new competing transportation line between the interior and Portland, the seaport for the Columbia River region. It seems undeniable that the availability of cheap water transportation would decidedly lower present transportation rates and thus be a material benefit to the producers of this region. Lower rates and better means of communication would also probably have a decided developing effect on the regions reached which should not be overlooked. The foreign shipments by sea of wheat and flour from Portland during the fiscal year 1900, as given by the Portland Merchants' Exchange Association, were 9,268,800 bushels of wheat and 1,086,915 barrels of flour. A barrel of flour is estimated at 4½ bushels of wheat, so that in 1900 14,159,918 bushels were received at Portland for foreign export alone. Of this amount 2,500,000 bushels are estimated to have been produced in the Willamette Valley, leaving a total of 11,659,918 bushels supplied by the region east of the Cascade Mountains. In 1899 a total of 12,984,783 bushels were likewise sent from the interior to Portland for export. These quantities are exclusive of what was received for home consumption. An annual saving in freight of a few cents per bushel on these quantities alone would pay for the proposed improvement of the Columbia River between The Dalles and Celilo in comparatively few years.

Present freight rates on wheat from Lewiston and the Palouse districts to Portland, Tacoma, or Seattle are reported to be 21¼ cents per cental, or 12¾ cents per bushel, the distance being, roughly, 350 miles. The rates to Portland from Walla Walla and Pendleton, roughly about 200 miles, are 10½ cents per bushel and 17½ cents per cental; from The Dalles to Portland, 88 miles (between which two points there is water as well as rail transportation), they are 4½ cents per bushel and 7½ cents per cental. These rates amount to about 5 cents per bushel per 100 miles, except from Lewiston, where the rate is about 4 cents per bushel.

On the Mississippi River the rate on wheat in sacks from St. Louis to New Orleans in 1899 was 10 cents per 100 pounds for the entire distance (about 700 miles), or a little less than a cent per bushel per 100 miles. The average rail rate for the same distance over the Illinois Central Railroad was 0.695 cents per ton per mile, or 3.475 cents per 100 pounds per 100 miles, or an equivalent of 2.09 cents per bushel per 100 miles, more than double the water rate. (Report for 1899, United States Department of Agriculture.)

It is a well-established fact that between competitive points for such commodities as can be carried equally well by water, transportation by water is considerably cheaper than by rail. Water freight rates are therefore usually understood to have a determining and regulating effect on the rates charged for all such transportation.

*Recommendation.*—As early as 1874 Major Michler, Corps of Engineers, reported that—

> * * * The importance of the proposed improvement can not be overestimated.

Major Powell, Corps of Engineers, in 1882, reported that—

> * * * In volume and commercial value the Columbia is second only to the Mississippi.

The 1890 Board of Engineers stated (House Ex. Doc. No. 73, Fiftieth Congress, second session) that—

> * * * The Board does not deem it necessary to present statistics or arguments to demonstrate the importance of the improvement of the Columbia River at the places mentioned in the law.

In discussing the benefits to be obtained by some efficient improvement of this locality the Board of Engineer Officers of 1892 (Senate Ex. Doc. No. 7, Fifty-third Congress, first session) reported as follows:

> The demand for the open navigation of the Columbia River comes from the wheat-growing districts east of the Cascade Range. Those portions which would now be affected by the improvements at The Dalles lie chiefly south and east of the Columbia, 115 miles to Wallula, and on both sides of it to Priest Rapids, 83 miles above, with a portion of the rich Walla Walla district. The improvement of the lower section of the Snake will open to the sea 200 miles of navigation, through the heart of the wheat lands of the "inland empire." Other large tracts tributary to it, but now considered barren, will doubtless be made productive in the not distant future, when water for irrigation is supplied. The wheat crop of eastern Oregon and Washington probably exceeds 400,000 tons. In 1890 the railways were not able to transport the crop to market within a reasonable time, presumably for want of rolling stock. The acreage of 1891 exceeded that of 1890, and it was feared that the railways would not be able to move the crop before the next would be harvested. The quantity of wheat and other cereals received at Portland from the country east of these obstructions in 1891 was nearly 8,000,000 bushels. The total receipts of agricultural products from eastern Oregon and Washington were 271,000 tons. From the information the Board has been able to obtain, it is probable that in 1891 about 15,000,000 bushels of wheat were shipped to the Pacific coast from the country which would be, to a greater or less extent, affected by the removal of these obstructions at The Dalles. Statistics for 1892 have not been available.
>
> The report of the internal commerce of the United States for 1890 estimates that the lands tributary to Tacoma and Portland were capable of producing 2,000,000 tons (more than 65,000,000 bushels) of wheat per year.
>
> These figures merely show the recent production of the country, which is rapidly increasing both in population and in production.
>
> Along the Columbia River the lands now productive are not immediately upon the borders of the stream, and the area which can reach the river is at present limited by the distance it will "pay" to haul the grain in wagons.
>
> It is not so upon the Snake; the Walla Walla district on the south and the Palouse country on the north extend almost, if not quite, to the river's bank. There is in the minds of the members of the Board no doubt that the improvement of the Lower Snake will follow the removal of the obstructions of The Dalles and the reestablishment of navigation on the Upper Columbia. A number of short railways have been built from the wheat centers to points on the main lines of transportation, and others will doubtless be constructed to the river if the navigation should assume sufficient proportions.
>
> The effect of water competition upon the cost of transportation between Dalles City, the present head of navigation, and Portland, which has been rendered possible within the last two years by the construction of the State portage railway at the Cascades has been to reduce the rates by rail on general merchandise from 67 cents per 100 pounds to 37 cents, and by water to still lower rates.
>
> For instance, wheat, of which 1,500,000 bushels are shipped, pays 11 cents per cental by water, against 17 cents by rail. Wool, which reaches 6,000,000 pounds, costs 20 to 25 cents per cental by water and 50 cents by rail. The water rates include 40 cents per ton paid to the State of Oregon for portage at Cascades.

The favorable indications of some years ago have been largely fulfilled, so that, from the best information now available the present annual output of this "inland empire" has increased to nearly 40,000,000 bushels of grain, including wheat, oats, and barley, or not nearly two-thirds of the capacity of the country as estimated by the Department of Agriculture, and to nearly 16,000,000 pounds of wool, or nearly three times the 1891 clip, while the areas of land under cultivation have largely increased and the production of cattle, fruit, and hogs has probably doubled in the past five years.

The soil of this region, being decomposed volcanic matter, is of unusual richness; and irrigation, practically just commenced, has already reclaimed much of what once was considered worthless land.

By its adoption in 1892 of the project for passing steamboats around the obstructions in the Columbia River between The Dalles and Celilo by means of a boat railway, and its appropriations of $250,000 for this purpose, Congress, it is assumed, practically indicated its views on the question of the worthiness of this locality for improvement by the General Government. The main point for present consideration, then, seems to be whether an improvement by means of the well-known and time-proven system of canals and locks, at a probable cost of about $4,000,000, is not better than an experiment in the shape of a boat railway at an estimated cost of nearly $3,000,000.

The boat railway is as yet new, untried, and wholly experimental. It would involve in this case the raising of a vessel from the water on a hydraulic lift for a height of 77 feet vertically at one end and on a similar lift 62 feet high at the other end, and carrying the boat on a specially designed car over about 9 miles of track having both vertical and horizontal curves. The successful docking of a vessel alone, even one of the light-draft, flat-bottom boats of the Columbia River, is an operation requiring nicety and care. Carrying one overland on a car is an operation not yet successfully accomplished anywhere under anything like similar conditions. The first boat railway upon which any construction work has ever been begun, or that has perhaps ever been carefully studied in detail, is the one in Canada known as the Chignecto Ship Railway, 17 miles long, connecting the Bay of Fundy with the Gulf of St. Lawrence. It is reported that $4,000,000 had to be spent on this ship railway up to 1893, and although it was originally expected to have completed it that year, I am informed it is now still unfinished, probably requiring an equal amount of money in addition to complete it. The line of this Chignecto Ship Railway had no curves, being a simple tangent throughout, and even then doubts were expressed by engineers as to its ultimate practicability. It is maintained by some engineers that while the moving of large, heavy structures, such as steamboats, overland on a railway car may theoretically be accomplished when the path is a straight line, nevertheless there is nothing in present railway practice to warrant the belief in successfully moving such structures over lines including curves.

On the other hand, the system of canals and locks is old, well tried, and gives assurance of being safe, sure, and efficient. It is simple in theory, construction, and operation, and does not require the boat to be removed from its proper element. It is looked on generally with much more favor by those closely interested. In my opinion, the advantages of the system of improvement by canals and locks far outweigh the probable difference in cost.

Some improvement of these obstructions so as to pass loaded vessels without undue interruption is anxiously looked for by the interests of the interior regions previously referred to. Experience at Cascade Locks, as well as at many places elsewhere, goes to show that water competition has a decided regulating influence on all freight rates. It seems to be undeniable that an efficient improvement of this locality will be of decided benefit to the producers and shippers of several States, and enable a greater development of the already great agricultural resources of a vast area.

In my opinion this work is one of public importance and one that is a worthy undertaking for the United States.

As to whether the present is the most advisable time to undertake a work of this magnitude, attention is invited to the reports of the two Boards of Engineers referred to above, both of which advocated the construction, equipment, and operation by the United States of a portage road to transfer freight around the obstructions between The Dalles and Celilo free of cost to the shippers. This road as proposed was to be only a temporary expedient to obtain prompt relief for the interior producers, and was to be followed by the more permanent improvement when necessary to accommodate the traffic. The conditions that existed at the date of these reports of the Boards have changed only in the direction of making their recommendations more worthy of consideration. Such a portage road could probably be completed at a little more than one-tenth of the cost of the proposed canals, and within less than half of the time, as the right of way is now nearly all secured, the acquisition of title to only a small portion awaiting further action by Congress.

This portage road, besides giving early relief to the producers of the interior, would in its operations serve to indicate plainly the probable volume of commerce that would use an improved river, thus determining the capacity of the permanent improvement required, the character and size of boats that must be provided for, and what further improvements are necessary in the Upper Columbia and Snake rivers. If, however, there is sufficient objection, as has been held by some, to the ownership and operation of such railways by the United States, then the early improvement by means of canals and locks is recommended.

Very respectfully, your obedient servant,

Wm. W. Harts,
*Captain, Corps of Engineers.*

Brig. Gen. John M. Wilson,
*Chief of Engineers, U. S. A.*

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## V V 17.

## EXAMINATION AND SURVEY OF SNAKE RIVER, IDAHO AND WASHINGTON.

[Printed in House Doc. No. 127, Fifty-sixth Congress, second session.]

Office of the Chief of Engineers,
United States Army,
*Washington, December 1, 1900.*

Sir: The emergency river and harbor act approved June 6, 1900, made provision for preliminary examination and survey of "Snake River, in the States of Idaho and Washington, from the head of navigation on said river to the point of junction with the Columbia River, with a view to improving said river."

Certain portions of Snake River have been under improvement by the United States since 1876, and in 1897 a survey of the river from the mouth to Riparia, Wash., was made under the provisions of the river and harbor act of June 3, 1896. In view of this latter fact, further consideration of the river up to Riparia was deemed unnecessary at this time, particularly as navigation to that point from below has of late years been practically abandoned. The operations of the present survey were therefore confined to that section of river from the upper limit of the former survey, near Riparia, to the present head of regular navigation, at Lewiston, Idaho.

Copies of reports by the local engineer officer, Capt. William W. Harts, Corps of Engineers, on preliminary examination dated June 25, 1900, and on survey dated November 15, 1900, are submitted herewith for transmission to Congress. In the survey report Captain Harts states that in his opinion Snake River between Riparia and Lewiston, the only portion now regularly used by vessels, is worthy of a limited improvement by the United States at the present time. The project presented provides for dredging, diking, and rock removal at the shoal places to secure a channel 5 feet deep at low water and generally 60 feet wide. The cost of the work proposed is estimated at $23,000, to which should be added $5,000 for maintenance every two years.

The views and recommendations of the local officer are concurred in by the division engineer, Col. S. M. Mansfield, Corps of Engineers.

Very respectfully, your obedient servant,

JOHN M. WILSON,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

Hon. ELIHU ROOT,
*Secretary of War.*

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## PRELIMINARY EXAMINATION OF SNAKE RIVER, IDAHO AND WASHINGTON, FROM THE HEAD OF NAVIGATION ON SAID RIVER TO ITS JUNCTION WITH THE COLUMBIA RIVER, WITH A VIEW TO ITS IMPROVEMENT.

ENGINEER OFFICE, UNITED STATES ARMY,
*Portland, Oreg., June 25, 1900.*

GENERAL: I have the honor to acknowledge the receipt of a letter dated Office of the Chief of Engineers, United States Army, June 13, 1900, assigning to me the duty of making a preliminary examination under the following-quoted provision of the act of Congress approved June 6, 1900:

> Snake River, in the States of Idaho and Washington, from the head of navigation on said river to the point of junction with the Columbia River, with a view to improving said river.

This river has already been personally visited by me and the information already at hand is sufficient to enable me to report without making further examination that the 71 miles of the Snake River from Lewiston, Idaho, the present head of regular navigation, down to Riparia, Wash., is worthy of improvement to the extent of making a survey, with estimate of cost of properly improving it. It is not deemed necessary to make further examination or survey of the 66.7 miles of the Snake River from Riparia down to the point of junction with the Columbia River, inasmuch as that portion of the stream was surveyed in 1897–98, under the provisions of the river and harbor act of June 3, 1896, the report of which was printed in the Annual Report of the Chief of Engineers, United States Army, for 1898, part 4, pages 3013—3024, and in House Doc. No. 411, Fifty-fifth Congress, second session. Above Lewiston vessels occasionally run at favorable stages of the river as far as Wild Goose Rapids, near the mouth of the Grande Ronde River, about 30 miles; but as the commerce is inconsiderable, the trips uncertain and irregular, and the natural condition of the river sufficiently good for all present and prospective needs, the part of the river above Lewiston is not deemed worthy of improvement at the present time nor worthy of a survey.

### CONDITION OF RIVER.

The Snake River rises in the southern part of Yellowstone National Park and flows southwesterly through the southeastern portion of Idaho until it reaches a point about 60 miles north of the Great Salt Lake, Utah; it then flows west and northwest through southern Idaho to the Oregon-Idaho boundary line, where it flows north, forming the boundary line between those States for about 200 miles. At Lewiston, Idaho, after receiving the waters of the Clearwater River, the Snake flows in a westerly direction to its mouth in the Columbia, a distance of about 138 miles below Lewiston. Regular navigation in Snake River is limited at the present time to the 71 miles from Lewiston down to Riparia.

### COMMERCE.

The country along the Snake River Valley from Lewiston down to the mouth of the river in the Columbia is capable of producing large quantities of wheat, and is also suitable for raising cattle. Wheat is now the chief product of the region. It is taken by boat to Riparia, thence by rail to Portland, at which latter place it is placed aboard ocean vessels for export to Europe and Asia. Considerable fruit is also raised along the river above Riparia for shipment. The commerce of this river for the calendar year 1899 was carried principally by the steamers of the Oregon Railroad and Navigation Company, and is as follows (the products of the country tributary to the Upper Snake River now transported by rail or without any transportation facilities are not considered):

*Commercial statistics for year ending December 31, 1899.*

| Articles. | Exported. | Imported. |
|---|---|---|
| | *Tons.* | *Tons.* |
| Fruit | 1,254 | ........... |
| Grain | 31,156 | 15 |
| Live stock | 300 | 69 |
| Lumber | 19 | 1,440 |
| Merchandise | 5,102 | 5,985 |
| Wool | 314 | ........... |
| Total | 38,145 | 7,509 |

There are about twenty rapids in Snake River between Lewiston and Riparia. Several of these have only about 2 feet of water on them at extreme low water, which causes a temporary suspension of navigation at such times. Congress has from time to time made appropriations for the improvement of the stream, and in late years these appropriations have been expended in scraping some of the more troublesome bars and constructing rubblestone deflecting dikes at the worst rapids between Lewiston and Riparia. No definite project with estimate of cost exists. It may be said, therefore, that this work has been carried on in a somewhat desultory way, due to the fact that definite data as to the exact condition of the whole river between Lewiston and Riparia was not at hand, a continuous survey between those points having never been made.

### COST OF SURVEY, ETC.

It is estimated that the contemplated survey may be made for not to exceed $2,500, and it is proposed to pay the expenses, if the survey is authorized, from the appropriation for improving Upper Columbia and Snake rivers, Oregon and Washington, provided that course be deemed proper. The sum of $4,800, approximately, of the appropriation for improving Upper Columbia and Snake rivers, Oregon and Washington, remains available.

Very respectfully, your obedient servant,

Wm. W. Harts,
*Captain, Corps of Engineers.*

Brig. Gen. John M. Wilson,
*Chief of Engineers, U. S. A.*
(Through the Division Engineer.)

[First indorsement.]

U. S. Engineer Office, Pacific Division,
*San Francisco, Cal., June 28, 1900.*

Respectfully forwarded to the Chief of Engineers.

The views of the district officer are concurred in.

S. M. Mansfield,
*Colonel, Corps of Engineers,*
*Division Engineer.*

[Second indorsement.]

Office Chief of Engineers,
U. S. Army,
*July 7, 1900.*

Respectfully submitted to the Secretary of War.

This report relates to preliminary examination of the navigable portion of Snake River, Idaho and Washington, required by the emergency river and harbor act approved June 6, 1900 (full text of item quoted within).

In the opinion of the local officer, concurred in by the division engineer, that part of Snake River from Lewiston, Idaho, the present head of regular navigation, down to Riparia, Wash., is worthy of improvement to the extent of making a survey. Survey of that part of the river from Riparia to its junction with the Columbia River was made in 1897-98 under the provisions of the river and harbor act of June 3, 1896.

Furthermore the statement is made that regular navigation on the river is limited at the present time to the 71 miles from Lewiston down to Riparia.

It is recommended that survey of Snake River, as proposed by Captain Harts, be authorized and the cost of improvement be estimated, the expense of said survey to be paid from the balance remaining available from appropriations for improving Upper Columbia and Snake rivers.

JOHN M. WILSON,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

[Third indorsement.]

WAR DEPARTMENT,
*July 10, 1900.*

Approved as recommended by the Chief of Engineers.

By order of the Secretary of War:

JOHN C. SCOFIELD,
*Chief Clerk.*

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### SURVEY OF SNAKE RIVER FROM LEWISTON, IDAHO, TO RIPARIA, WASH.

UNITED STATES ENGINEER OFFICE,
*Portland, Oreg., November 15, 1900.*

GENERAL: In compliance with the instructions contained in letter dated Office of the Chief of Engineers, United States Army, Washington, July 11, 1900, assigning to me the duty of making a survey of the Snake River from Lewiston, Idaho, to Riparia, Wash., ordered by act of Congress approved June 6, 1900, I have the honor to submit the following report:

*Description.*—The Snake River is a long and very crooked mountain stream flowing for upward of 900 miles down the western slope of the Rocky Mountains. It is extremely irregular in its direction of flow, width, depth, and slope, as well as in its banks and bed. Portions of it are inclosed in steep, rocky canyons where the great slope causes extreme velocities, portions of it include waterfalls and cascades of great beauty, but only in its lower portions are reaches found where navigation is practicable. It rises in the mountains in the southern part of Yellowstone Park, flows southwest through the southeastern part of Idaho until within about 60 miles of the Great Salt Lake of Utah, and then flows westward through southern Idaho. It then turns north and forms for 200 miles the boundary between the States of Idaho and Oregon. At Lewiston, Idaho, where it receives the waters of the Clearwater River, it again flows westward and finally empties into the Columbia River in the State of Washington near the town of Ainsworth. It is subject each summer to very high rises, varying from 18 to 26 feet, due to melting of snow in the mountains, and remains in a state of flood for several months, usually commencing early in May and lasting until September. There is also usually an autumn rise in November varying from 4 to 10 feet, due to rains in the areas drained. The low-water discharge of the Snake at its mouth in the Columbia River is reported to be 26,000 cubic feet per second. (See Annual Report of the Chief of Engineers for 1889, p. 2584.)

The basin drained by the Snake River and its branches comprises the greater part of southern Idaho, large parts of eastern Oregon and southern Washington, and parts of Utah, Wyoming, and Nevada. This area is estimated to be 104,000 square miles (see House Doc. No. 411, Fifty-fifth Congress, second session).

Geologists state that the greater part of all this area has in former geological periods been subject to successive overflows of volcanic lava that now form the basaltic cliffs and mountains found in general over all this region. The river banks are, therefore, rocky and not easily washed, so that the Snake is not what may be properly termed a sediment-bearing stream. Considerable sand and gravel are carried, however, due mainly to the disintegration and wearing away of the rocks and bowlders forming its banks and bottom. The bottom also is mainly rock and bowlders except where the sand and gravel have collected, due to natural causes, thus forming bars and shoals. In its upper portions it is said to be a typical mountain stream, having a rocky bed and swift currents with many picturesque falls and cascades. Above Huntington, Oreg., it does not appear that any special attempt at navigation has ever been made, probably because impracticable. Below Huntington, which is the western terminus of the Oregon Short Line Railroad, and the eastern terminus of the rail line of the Oregon Railroad and Navigation Company, there is a reach of about 50 miles where an effort was once made at navigation many years ago, in the endeavor to afford water transportation from the Seven Devils mining region to Huntington.

The Government spent a considerable sum of money from 1891 to 1896 in improving Snake River in the vicinity of Huntington. This was of no avail, however, as the only boat ever built for this section of the river, the *Norma*, gave up trying to run, after one trip, on account of the lack of paying business and the difficulties of navigation. Lower down, from near Ballards Landing, just below Pine Creek, and as far down as the mouth of the Salmon River, the Snake flows in a deep, narrow canyon of basaltic rock for about 75 miles, where the slope of the river surface, sharp bends, and high, irregular banks cause high velocities and cross currents and offer a serious obstruction to navigation that will always be formidable and dangerous, if not wholly unnavigable. From the mouth of the Salmon River down to the mouth of the Grande Ronde River the difficulties of navigation are somewhat less serious, but still probably render the river impossible for practicable navigation. The mouth of the Grande Ronde River may be taken as the present head of practicable *high-water* navigation in the Snake. The lower 139 miles, however, from the mouth at Ainsworth, Wash., up as far as Lewiston, is the only part that has been successfully navigated at lower stages.

In former days, before the construction of the railroads, this lower section of the river, in connection with the Columbia River, formed the only quick and safe means of communication with Portland, Oreg., and the Pacific coast, where were located the commercial centers. Light-draft river boats plied from Portland as early as 1858 up the Willamette and Columbia rivers 45 miles to the obstructions at "The Cascades," where a portage railway 6 miles long, on the Washington shore, passed the freight and passengers around these obstructions. For about 45 miles more steamers were operated in what was then called the "middle Columbia River," or up to the town of The Dalles, Oreg., and there a second portage road, 13 miles long, on the Oregon shore, enabled freight and passengers to pass the obstructions between The Dalles and Celilo, Oreg., and be transferred to steamers on the "upper river," above Celilo. These latter steamers at most favorable stages, and usually for more than half of each year, could ascend from Celilo up the Columbia to the mouth of the Snake, and up the Snake to Lewiston, which latter place thus became at an early date a center of distribution for a large outlying fertile region. The opening of the locks at "The Cascades," in 1896, by the Government enabled steamboats to pass around one of the worst obstructions in the Columbia River, leaving the obstructions in the 12 miles between The Dalles and Celilo the only impassable ones to be overcome artificially in reaching Lewiston by water from Portland.

The completion of the Portland-Spokane line of the Oregon Railroad and Navigation Company's railroad, in 1887, along and adjacent to the Columbia and Snake rivers as far as Riparia, Wash., robbed those two waterways of much of their old-time importance, so that all river navigation and portages on the Columbia above The Dalles and on the Snake were practically abandoned in 1888, except on the 73 miles of the Snake between Riparia, Wash., and Lewiston, Idaho. Between these two points regular navigation has been maintained by the steamers of the Oregon Railroad and Navigation Company up to the present time, and occasional trips are also made by boats belonging to the Northern Pacific Railway Company and others. Occasional trips on the upper Snake have been made as far as the Grande Ronde River, about 25 miles above Lewiston, when the stage of water was favorable, but these trips are now so few and unimportant that the condition already existing, especially at boating stages, is believed to be sufficient for all the present needs of commerce. The proposed improvement by the Government of the Columbia River between The Dalles and Celilo will, if undertaken and finished, likely revive some of the old-time importance of the Snake River, especially from Lewiston down to its mouth, providing, as it would, an all-water transportation route during at least a portion of each year from Lewiston to Portland.

A survey of the lower 66 miles of the Snake River from Riparia down to the mouth, made in 1897 under direction of Capt. Harry Taylor, Corps of Engineers (report of survey printed in House Doc. No. 411, Fifty-fifth Congress, second session), renders a further survey of this portion unnecessary at this time, so that the portion from Riparia to Lewiston, being the only portion now regularly used by vessels, the subject of this survey and report, is the only remaining part believed to be worthy of consideration at the present time in connection with the improvement of the river for navigation.

In the portion from Lewiston to Riparia (73.5 miles), recently surveyed, the average width is, approximately, 750 feet, the discharge 22,000 feet per second, the total fall 196.6 feet, and the slope an average of 2.67 feet per mile. The low-water depth varies from 2½ feet to 25 feet, with an average channel depth of about 8 feet, and the velocity from 1.3 to 8.8 miles per hour. The banks are about 1,500 feet high and usually slope to the water's edge. In a few places, however, there are found narrow and fertile "bottoms," limited in area, usually lying at the mouths of small creeks. These "bottoms" are the only cultivated lands immediately adjacent to the river, but these when irrigated are very fertile and yield luxuriantly a fine quality of fruit, berries, etc., considerable quantities of which are shipped out annually.

The river banks slope back to a height of many hundreds of feet, and the bunch grass found thereon offers a sparse but fairly good grazing for sheep and cattle. On high plateaus, some miles back from the river, are the richly productive wheat fields of eastern Washington and Oregon. Much of the wheat, now amounting to many millions of bushels annually, raised in the Camas and Clearwater basins, Palouse and Big Bend countries, and the Wallawalla and Wallowa regions now passes down the Snake and Columbia River valleys by rail. For a further description of the Snake River, including description of the rapids and bars and the work done in past years, attention is respectfully invited to Annual Reports of Chief of Engineers for 1877, page 1037; for 1889, page 2583, and for 1891, page 3218.

*Previous improvement.*—The Upper Columbia and Snake rivers having formed one of the most important highways of travel in the region in early days before the railroads were completed, Congress, as early as 1872, made appropriations for the improvement of the Columbia, and in 1876 the Snake was added to the plan of improvement. From that time up to the present a total of $288,500 has been appropriated for both rivers, of which, as near as can be learned from the records, $117,850.57 have been applied to the Snake River from Lewiston down to its mouth, mainly below Riparia. The original project was to secure a depth of 4½ feet at low water from the mouth up to Lewiston. The greater part of this improvement was made below Riparia, as the dangers and difficulties met with by steamboats were greatest there. The method of improvement consisted mainly in blasting out obstructing bowlders, removing dangerous ledges, scraping sand and gravel bars, and the construction of dikes to concentrate the river flow in selected channels. This work on the Lower Snake below Riparia was stopped in 1888, as the steamboats had abandoned that section upon completion of the railways paralleling it, and the expenditures since then being small have all been devoted to improving the portion in actual use between Riparia and Lewiston.

In 1892 $20,000 and in 1894 $25,000 were, as before referred to, appropriated for the improvement of the Snake from Huntington bridge down to the Seven Devils mining district. Considerable work was done in freeing the river from obstructions in this locality. Considerable plant was collected, including drill scows, tools, etc., and the work of removing ledge rock and bowlders was carried on for several seasons. Only one steamer, the *Norma*, was ever built for navigating this section of river, and she made but one trip, and then the owners abandoned the idea of running. In 1896 all the Government plant in this portion of the river was sold and the river improvement abandoned.

Before the improvement of the Lower Snake was commenced there were many shoal places where there was not over 2 feet depth at low water. At many rapids the channel, besides being shoal, was rocky and thickly studded with obstructing bowlders, and was very crooked and intricate. The currents were very swift at places, and the early attempts at navigation were accordingly attended with frequent delays, much risk, and occasional loss. The effect of the improvement has been to remove ledge rocks from many places below Riparia, partially straightening the channel, and freeing the river of many obstructing points. Many bowlders have been blasted, and sand and gravel bars scraped, both above and below Riparia. At several places considerable benefit has been obtained by the construction of dikes, closing undesirable channels and directing the river flow into selected places to occasion scour and increase the depths.

Above Riparia the present condition meets fairly well the present demands of navigation at all stages except at and near extreme low water. Extreme low water is seldom reached and only occasionally are boats prevented from using the river for this reason, and then for only short periods. Much delay is experienced near low-water stages, however, by having to "line" the boats over bars and by having to run with only partial loads.

*Previous examinations and surveys.*—An examination of the Upper Columbia and Snake rivers was made in 1866 by Lieut. (now Lieut. Col.) W. H. Heuer, Corps of Engineers, and an estimate of cost of improvement made (see Annual Report, Chief of Engineers, 1866, Part IV, p. 330), amounting to $166,686, with $6,000 annually for dredging. In 1877 a further examination, with estimate of cost of improvement, amounting to $132,000, was made by Maj. (now Brig. Gen.) John M. Wilson, Corps of Engineers. No continuous survey of the Columbia and Snake rivers has ever been made up to the present day. The plans of improvement proposed in these projects were for the benefit of the special places found most troublesome by steamboats, and only special, limited surveys of the localities to be improved were made.

In 1897 a survey from Riparia to the mouth was made under direction of Capt. Harry Taylor, Corps of Engineers, and a project and estimate of cost submitted under date of January 27, 1898 (House Doc. No. 411, Fifty-fifth Congress, second session). The project of improvement as stated in this report was for securing at low water a least navigable depth of 5 feet everywhere from Riparia down to the mouth, a distance of 66 miles. The cost was estimated at $165,000, with $3,000 every two years for maintenance.

*Present survey.*—The present survey was commenced July 28, 1900, and the field work was completed September 24, 1900. The party, numbering 15, was under charge of Mr. Frank Gilham and was composed of a transit party and a level party, with the necessary boatmen, cook, and laborers. The party, using four bateaux, commenced at Lewiston and drifted downstream from time to time with the current when it was necessary to change camp sites. A line of levels, checked by a duplicate set of readings, was carried throughout the entire distance, the zero being the level of mean low water at the sea, assuming as correct the corresponding elevation of low water at Lewiston (709.6) as observed by the Oregon Railroad and Navigation Company.

Low-water level was obtained from the zero of the gauge at Lewiston on the Oregon Railroad and Navigation Company's warehouse and from that of the gauge on the central pier of the drawspan of the Riparia Railway bridge. These gauges were read daily at noon during the survey, and were found to indicate fairly well the corresponding stages of water at the two places. These gauges were put in place by the railway companies and have been read for many years by them.

The zeros give the best information available of the level of extreme low water. A traverse line carefully checked was also run over the entire distance as a basis for locating the river's direction, widths, and depths. Current observations were observed with surface floats at all important rapids. Bench marks were left every few miles for future reference. Bank contours 20 feet apart were observed throughout the distance. The total cost of the field work was $2,563, or $34.87 per mile. The office work of plotting, etc., cost $730, making the total cost of the completed survey $3,293, or $44.80 per mile.

A list of the most important rapids, with their location, depth, and slope, is given below.

Maps[1] of the plan and profile of the river surveyed, showing the more important shoals on a larger scale wherever improvement is proposed accompany this report.

*Commerce.*—The Snake River drains a vast territory but the commerce that is now affected by its navigability is not extensive. It is limited mainly to the fruit raised along the "bottoms" adjacent to the river and to the wheat, sheep, and cattle that are raised on the plateaus back of the river, and which can be profitably taken to some point where a boat landing can be reached. As all the products of this region beyond that for a local supply must under present conditions be transshipped to rail at either Lewiston or Riparia this means of transportation does not afford the usual competition found in many waterways. This piece of river is therefore practically only a feeder to the Oregon Railroad and Navigation Company's line at Riparia and to the Northern Pacific Railroad at Lewiston. Until an open river is secured in the Columbia between The Dalles and Celilo these general conditions will not be much changed.

The commerce of the Snake River between Riparia and Lewiston for the calendar year 1899 was as follows:

| Articles. | Exported. | Imported. |
|---|---|---|
| | *Tons.* | *Tons.* |
| Fruit | 1,254 | |
| Grain | 31,156 | 15 |
| Live stock | 300 | 69 |
| Lumber | 19 | 1,440 |
| Merchandise | 5,102 | 5,985 |
| Wool | 314 | |
| **Total** | 38,145 | 7,509 |
| Total exports and imports | | 45,654 |

*Commerce in tons by years.*

| Year. | Tons. | Year. | Tons. |
|---|---|---|---|
| 1875 | 18,230 | 1894 | 9,902 |
| 1879 | 65,975 | 1895 | 37,100 |
| 1884 | 30,260 | 1896 | 25,977 |
| 1891 | 31,400 | 1897 | 31,553 |
| 1892 | 19,167 | 1898 | 36,925 |
| 1893 | 19,864 | 1899 | 45,654 |

(Statistics for years not given are not available.)

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[1] Not printed.

*Present condition and improvement proposed.*—The description of the shoals, rapids, and other obstructed places between Riparia and Lewiston, where trouble in navigation is experienced at the present time, is as follows:

*List of rapids, shoals, and prominent points in Snake River from Lewiston, Idaho, to Riparia, Wash.*

| Locality. | Distance from Lewiston. | Elevation of low-water surface. | Fall of water. | Rate of fall per mile. | Length of rapid. | Depth at low water. | Velocity of current per hour. | Character of bottom. |
|---|---|---|---|---|---|---|---|---|
| | *Miles.* | *Feet.* | *Feet.* | *Feet.* | *Miles.* | *Feet.* | *Miles.* | |
| Beginning of survey (above Lewiston). | 0.25 | 709.6 | ...... | ...... | ...... | ...... | ...... | |
| Lewiston | .00 | 709.59 | ...... | ...... | ...... | ...... | ...... | |
| Lewiston rapid: | | | | | | | | |
| Head | .01 | 709.4 | 4.1 | 7.19 | 0.57 | 7 | 7.93 | Gravel 6 inches in diameter and smaller. |
| Foot | .58 | 705.3 | | | | | | |
| Clearwater River | .60 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Riffle No. 1: | | | | | | | | |
| Head | 1.71 | 701.7 | 1.5 | 7.50 | .20 | 10 | 7 | Gravel 6 inches in diameter and smaller. |
| Foot | 1.91 | 700.2 | | | | | | |
| Dead March: | | | | | | | | |
| Head | 3.20 | 699.4 | 7.3 | 9.30 | .76 | 4 | 6 | |
| Foot | 3.96 | 692.1 | | | | | | |
| Dry Gulch Shoal | 4.45 | 689 | 7 | 8.80 | .08 | 2.5 | 5.80 | |
| Dry Gulch Rapid: | | | | | | | | |
| Head | 4.66 | 688 | 3.4 | 34 | .10 | 8 | 8.80 | Bowlders and gravel, principally bowlders. |
| Foot | 4.76 | 684.6 | | | | | | |
| Alpowa | 9.40 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Alpowa Rapid: | | | | | | | | |
| Head | 9.42 | 676.8 | 1.1 | 5.79 | .19 | 7 | ...... | Sand and gravel. |
| Foot | 9.61 | 675.7 | | | | | | |
| Steptoe Rapid: | | | | | | | | |
| Head | 11.06 | 673.4 | 5.3 | 9.61 | .55 | 5.5 | 7.10 | Gravel 6 inches in diameter and smaller. |
| Foot | 11.61 | 668.1 | | | | | | |
| Little Pine Tree Shoal | 13.01 | 666 | 1.7 | 4.50 | .38 | 2 | 4 | ½ gravel 6 inches in diameter and smaller; ½ bowlders 6 to 24 inches. |
| Little Pine Tree Rapid: | | | | | | | | |
| Head | 13.12 | 665.3 | 6.9 | 24.64 | .28 | 8 | 7.50 | Bowlders and gravel, principally bowlders. |
| Foot | 13.40 | 658.4 | | | | | | |
| Riffle No. 2 | 15.03 | 655 | .3 | 1.50 | .20 | 4.5 | ...... | Gravel 6 inches in diameter and smaller. |
| Tramway Rapid: | | | | | | | | |
| Head | 16.06 | 654.1 | .8 | 8 | .10 | 13 | ...... | Bowlders and gravel. |
| Foot | 16.16 | 653.3 | | | | | | |
| Bucket tramway | 17.36 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Rapid No. 8: | | | | | | | | |
| Head | 19.73 | 650.2 | 5.2 | 4.45 | 1.17 | 4 | 5.20 | Gravel 6 inches in diameter and smaller. |
| Foot | 20.90 | 645 | | | | | | |
| Rapid No. 9: | | | | | | | | |
| Head | 23.73 | 639.2 | 2.4 | 14.12 | .17 | 5 | 7 | |
| Foot | 23.90 | 636.8 | | | | | | |
| Granite Point Rapid. | | | | | | | | |
| Head | 25.13 | 635 | 4.9 | 11.95 | .41 | 5 | 5.35 | Bowlders 24 inches in diameter and larger. |
| Foot | 25.54 | 630.1 | | | | | | |
| Granite Point | 26.51 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Tramway | 28 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Wawawa | 29.30 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Ofields Bar: | | | | | | | | |
| Head | 31.56 | 627.2 | 6.2 | 12.40 | .50 | 2 | 6.30 | Gravel 6 inches in diameter and smaller. |
| Foot | 32.06 | 621 | | | | | | |
| Log Cabin Rapid: | | | | | | | | |
| Head | 32.81 | 620 | 3.3 | 7.33 | .45 | 3 | 5.10 | |
| Foot | 32.26 | 616.7 | | | | | | |
| Almota Dead March: | | | | | | | | |
| Head | 33.94 | 616.4 | 5 | 5<br>8.33 | .92 | 3.6 | 5<br>7 | |
| Foot | 34.86 | 611.4 | | | | | | |
| Almota | 36.30 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Ilia Bar | 37.82 | 606.5 | .6 | 2 | .30 | 4 | ...... | Gravel 6 inches in diameter and smaller. |
| Ilia Rapid: | | | | | | | | |
| Head | 38.13 | 606.2 | 7.4 | 12.53 | .59 | 6 | 7.60 | Solid rock, bowlders, and gravel. |
| Foot | 38.72 | 598.8 | | | | | | |
| Ilia | 38.57 | ...... | ...... | ...... | ...... | ...... | ...... | |

*List of rapids, shoals, and prominent points in Snake River from Lewiston, Idaho, to Riparia, Wash.*—Continued.

| Locality. | Distance from Lewiston. | Elevation of low-water surface. | Fall of water. | Rate of fall per mile. | Length of rapid. | Depth at low water. | Velocity of current per hour. | Character of bottom. |
|---|---|---|---|---|---|---|---|---|
| | *Miles.* | *Feet.* | *Feet.* | *Feet.* | *Miles.* | *Feet* | *Miles.* | |
| Lower Ilia Rapid: | | | | | | | | Gravel 6 inches in diameter and smaller. |
| Head | 40.21 | 592.8 | 1.4 | 11.67 | .12 | 5 | ...... | |
| Foot | 40.33 | 591.4 | | | | | | |
| Wades Rapid: | | | | | | | | |
| Head | 42.61 | 589.4 | 3 | 9.10 | .33 | 6 | 7 | |
| Foot first pitch | 42.94 | 586.4 | | | | | | |
| Head second pitch | 42.94 | 586.4 | 1.5 | 5.77 | .26 | 7 | ...... | |
| Foot second pitch | 43.20 | 584.9 | | | | | | |
| Rapid No. 16: | | | | | | | | |
| Head | 46.01 | 581.4 | 2.3 | 8.52 | .27 | 5 | 4.50 | Bowlders and gravel; principally gravel. |
| Foot | 46.28 | 579.1 | | | | | | |
| Upper Penewawa Rapid: | | | | | | | | |
| Head | 47.93 | 577.6 | 3.3 | 9.17 | .36 | 5 | 7 | Bowlders and gravel, 6 to 24 inches diameter. |
| Foot | 48.29 | 574.3 | | | | | | |
| Lower Penewawa Rapid: | | | | | | | | |
| Head | 48.72 | 572.8 | 1.5 | 7.50 | .20 | 6 | ...... | Gravel, 6 inches in diameter and smaller. |
| Foot | 48.92 | 571.3 | | | | | | |
| Penewawa | 49.56 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Willow Rapid: | | | | | | | | Bowlders and gravel. |
| Head | 50.74 | 568.9 | 2.5 | 10 | .25 | 6.5 | 8 | |
| Foot, first pitch | 50.99 | 566.4 | | | | | | |
| Head, second pitch | 50.99 | 566.4 | 2.8 | 6.83 | .41 | 8 | 7.40 | |
| Foot, second pitch | 51.40 | 563.6 | | | | | | |
| Central Ferry | 56.57 | ...... | ...... | ...... | ...... | ...... | ...... | |
| Dead Man Rapid: | | | | | | | | Gravel 6 inches in diameter and smaller. |
| Head | 56.86 | 557.6 | 4.4 | 11.28 | .39 | 2.8 | 6.10 | |
| Foot | 57.25 | 553.2 | | | | | | |
| Diamond Crossing: | | | | | | | | |
| Head | 58.32 | 552.2 | 5.7 | 4.95 | 1.15 | 3 | 5.40 | |
| Foot | 59.47 | 546.5 | | | | | | |
| New York Bar Rapid: | | | | | | | | |
| Head | 59.96 | 545.5 | 3.8 | 8.61 | .44 | 6.5 | 7 | |
| Foot | 60.40 | 541.7 | | | | | | |
| Upper Goose Island Rapid: | | | | | | | | |
| Head | 63.76 | 539.5 | 4.3 | 9.15 | .47 | 3.5 | 7 | |
| Foot | 64.23 | 535.2 | | | | | | |
| Goose Island Bar | 64.60 | 535.2 | ...... | ...... | .15 | 2 | ...... | |
| Goose Island Rapid: | | | | | | | | |
| Head | 64.67 | 535.2 | 3.5 | 29.17 | .12 | 6 | 8.80 | |
| Foot, first pitch | 64.79 | 531.7 | | | | | | |
| Head, second pitch | 64.79 | 531.7 | 1.8 | 7.50 | .24 | 7 | ...... | |
| Foot, second pitch | 65.03 | 529.9 | | | | | | |
| Little Goose Island Rapid: | | | | | | | | ½ gravel 6 inches in diameter and smaller, ½ bowlder gravel 6 inches to 24 inches. |
| Head | 67.75 | 528.3 | 3.6 | 10.28 | .35 | 3 | 5.30 | |
| Foot | 68.10 | 524.7 | | | | | | |
| Little Goose Island Bar: | | | | | | | | |
| Head | 68.50 | 523.1 | 1.9 | 3.73 | .51 | 3 | 5 | |
| Foot | 69.01 | 521.2 | | | | | | |
| Rapid No. 24 | | | | | | | | |
| Head | 69.01 | 521.2 | 3 | 6.33 | .47 | 6.5 | 6.50 | Gravel 6 inches in diameter and smaller. |
| Foot | 69.48 | 518.2 | | | | | | |
| Upper Riparia Rapid: | | | | | | | | |
| Head | 71.03 | 516.9 | 3 | 10.35 | .29 | 7 | 6.10 | Bowlders and gravel, principally gravel. |
| Foot | 71.32 | 513.9 | | | | | | |
| Riparia Bridge | 72.85 | 513.3 | ...... | ...... | ...... | ...... | ...... | |
| Riparia (end of survey) | 73.25 | 513 | ...... | ...... | ...... | ...... | ...... | |

Length of river surveyed, 73.5 miles.

NOTE.—Elevations refer to mean low tide at Astoria, Oreg., as given by the Oregon Railroad and Navigation Company's levels.

Water surface refers to extreme low water.

The steamer landing at Lewiston, Idaho, is the commencement point of the survey.

### DETAILED DESCRIPTION OF SHOALS, RAPIDS, AND PROMINENT POINTS IN SNAKE RIVER FROM LEWISTON, IDAHO, TO RIPARIA, WASH.

Beginning of the survey is 0.25 mile above Oregon Railroad and Navigation Company's warehouse at Lewiston, Idaho.

*Lewiston*, a city of about 5,000 inhabitants, is situated at the confluence of the Snake and Clearwater rivers, on the right bank of former and left bank of latter.

1. *Lewiston Rapid.*—This rapid is opposite Lewiston. It has a length of 0.57 of a mile and a fall of 4.1 feet, or at the rate of 7.19 feet per mile. The river just above the rapid has a low-water width of about 900 feet, narrowing down, with an almost square-shouldered gravel bar on the right, to a width of 230 feet. The gravel bar has a height of about 5 feet above low water, and width of about 900 feet. On the left bank of the river is a gravel bluff about 40 feet high. This sudden narrowing of the river, together with a shoal place extending across the river just above the head of the rapids, causes a current of 7.93 miles per hour. The least depth of water is 7 feet. No improvement is deemed necessary at this place, as the only difficulty experienced now is caused by the strong current.

The Clearwater River empties into the Snake from the northeast, 0.60 mile below Lewiston. It has a low-water width of about 350 feet and a depth of about 7 feet. It is the only stream of any importance emptying into the Snake River between Lewiston and Riparia.

2. *Riffle No. 1* (*1.71 miles below Lewiston*).—It is 0.20 of a mile in length and has a fall of 15 feet, or at the rate of 7.5 feet per mile, and a least depth of water of 10 feet. No special impediment to navigation was found here and no improvement is necessary.

3. *Dead March* (*3.2 miles below Lewiston*).—It has a length of 0.76 of a mile and a fall of 7.3 feet, or at the rate of 9.3 feet per mile. The least depth of water found was 4 feet. The river, which above the rapid is about 900 feet wide, is here divided by an island, which throws the main body of water into a channel on the south side about 450 feet wide. This sudden narrowing produces a current of 6 miles per hour. The other channel to the north of the island is about 150 feet wide and 1.2 feet deep and is blocked by shoals and bowlders and not available for navigation at low stages. No special difficulty is experienced here now, but to secure a 5-foot channel it will be necessary to dredge near the lower end.

4. *Dry Gulch Shoal.*—This shoal is just above Dry Gulch Rapid and 4.45 miles below Lewiston. The river at this point makes a turn to the left and a tongue-shaped point reaches out from the left bank terminating in a shoal which extends across the river. The deepest water found on this shoal was 2.5 feet. It is proposed to dredge a channel 5 feet deep and 120 feet wide through this shoal.

5. *Dry Gulch Rapid* (*4.66 miles below Lewiston*).—It has a length of 0.10 of a mile and a fall of 3.4 feet, giving a rate of fall of 34 feet per mile, and a current of 8.8 miles per hour. A depth of 8 feet was found at the shoalest place. The swift water is caused by insufficient cross section, the river narrowing from 800 feet to 230 feet between a low gravel bar on the right bank, about 500 feet wide and 2 feet deep above low water, and a low rocky bluff on the left. The only impediment to navigation is the strong current. No improvement is proposed.

*Alpowa* (*9.4 miles below Lewiston*).—A small settlement on the left bank of the river at the mouth of Alpowa Creek. A current ferry is maintained at this point.

6. *Alpowa Rapid* (*9.42 miles below Lewiston*).—It has a length of 0.19 of a mile and a fall of 1.1 feet, giving a rate of fall of 5.79 feet per mile. Seven feet was the shoalest water found here. No special obstruction to navigation exists.

7. *Steptoe Rapid* (*11.06 miles below Lewiston*).—It has a length of 0.55 of a mile and a total fall of 5.3 feet, or a rate of fall of 9.64 feet per mile. The difficulty here is the strong current, 7.1 miles per hour, and the crooked, narrow channel. Five and five-tenths feet depth at low water was found at the shoalest point. The river at the head of the rapid has a width of about 750 feet between high banks, and is divided by a low island 500 feet wide and 1.5 feet above low water. This throws the main body of water into a channel on the right about 250 feet wide, the other channel on the left being only about 120 feet wide and 1 foot deep. This reduction of the section, taken in connection with a shoal just above the rapid, has a damming effect, the channel acting as a spillway. The improvement proposed at this place includes the deepening and straightening of the channel by dredging.

8. *Little Pine Tree Shoal* (*13.01 miles below Lewiston*).—It is probably caused by the river attaining the extreme width of 1,000 feet between low-water shore lines with a very uniform cross section. The depth of water varies from 2 to 7 feet, and falls at the rate of 4.5 feet per mile with a current of about 4 miles per hour. Dredging is necessary at this place.

9. *Little Pine Tree Rapid* (*13.12 miles below Lewiston*).—This rapid has a length of 0.28 of a mile and a fall of 6.9 feet, or at the rate of fall of 24.64 feet per mile. The only special impediment to navigation is the strong current, which flows at the rate of 7.5 miles per hour. The least depth of water found here was 8 feet. The rapid is caused by a low gravel bar which extends out from the right bank about 400 feet. This has the effect of diminishing the width of the river from 900 feet just above the bar to 350 feet opposite to it. No improvement is proposed at this place.

10. *Riffle No. 2* (*15.03 miles below Lewiston*).—No difficulty is now experienced in navigating the river at this point. The rate of fall per mile is but 1.5 feet, with a slow current; 4.5 feet was the least depth found. No improvement is thought necessary at the present time.

11. *Tramway Rapid* (*16.06 miles below Lewiston*).—This place offers now no special difficulties to navigation. The rapid has a total fall of 0.8 foot, or at the rate of 8 feet per mile. It is but 0.1 of a mile in length. The least depth found was 13 feet.

*Bucket Tramway* (*17.36 miles below Lewiston*).—Consists of a system of buckets hung on a wire rope for bringing wheat down from the farming land, about 1,500 feet above the river, to the steamer landing on the south bank of the river.

12. *Rapid No. 8* (*19.73 miles below Lewiston*).—It is 1.17 miles in length and has a total fall of 5.2 feet, or at the rate of 4.45 feet per mile, with a current of 5.2 miles per hour. It has never been considered a difficult place to navigate. Four feet was the least depth found. Several bowlders should, however, be removed at this place.

13. *Rapid No. 9* (*23.73 miles below Lewiston*).—It has a length of 0.17 of a mile and a fall of 2.4 feet, or at the rate of 14.12 feet per mile. It has a current of 7 miles per hour. The only impediment offered to navigation is the strong current, there being 5 feet of water at the shoalest place.

14. *Granite Point Rapid* (*25.13 miles below Lewiston*).—It is 0.41 of a mile in length and has a fall of 4.9 feet, or at the rate of 11.95 feet per mile. It has a current of 5.35 miles per hour. The only important obstruction to navigation at this point consists of two rocks about 1.5 feet below low water. These rocks aggregate about 50 cubic yards. The rapid is caused by a sunken ledge of rocks extending across the river which has caused a bar about 600 feet wide to form on the right bank. The effect of this is to reduce the distance between the water lines from 900 feet above the rapid to 400 feet at its narrowest place. There are many sunken rocks and bowlders in this stretch, but a fair channel is open near the left bank. The soundings gave 5 feet of water at the shoalest place. The two bowlders above mentioned should be removed.

*Granite Point* (*26.51 miles below Lewiston*).—A granite ledge cropping out about 150 feet above the level of the water on the north side extends across the river, showing on the opposite bank. The granite in this quarry is of an excellent quality. It has been worked for about twenty years. Among other structures built of this stone might be mentioned the piers for the bridge across Snake River at Ainsworth, and the new custom-house at Portland, Oreg. The water at this place has a depth of 45 feet, being the deepest water between Lewiston and Riparia.

*Tramway* (*28 miles from Lewiston*).—A tramway on the left bank of the river which is operated by the gravity system, the loaded cars coming down pulling the empty cars up. It is for the purpose of bringing wheat down to the river from the farming lands on the high plateaus.

*Wawawa* is a small settlement on the right bank of the river, 29.3 miles below Lewiston. A current ferry is operated at this point, it being one of the crossings of the Pomeroy-Colfax wagon road.

15. *Ofields Bar* (*31.56 miles below Lewiston*).—The river at this place has a low-water width of 800 feet, and a high-water width of about 2,500 feet. It has a fall of 6.2 feet in 0.5 of a mile, or at the rate of 12.4 feet per mile, and has a current of 6.3 miles per hour. About 100 feet out from the right bank there is a long, narrow island exposed for a width of about 20 feet at low water, which parallels the shore for about 1,000 feet. This terminates at the lower end in a bar which extends diagonally across the river, connecting with a small island near the right shore about 1,200 feet below. The water on this bar has a low-water depth of 1.5 feet. Between the upper end of this narrow island and the left shore of the river the water has a depth of 4 feet, and at a point about opposite the lower end of the island and about midway between it and the left shore the water has a depth of 5.5 feet, extending up and down stream for about 400 feet. The method employed in navigating this part of the river at low water has been to keep near the right shore, passing through the chute-like channel between the narrow island and the right shore and following the right bank for about 400 feet above the head of the island (see map). This is necessary on account of shoal water extending above the head of the island. The current is very strong in this narrow passage, necessitating the use of a line on

upstream boats. This narrow channel has a depth of 2 feet at its shoalest place, but owing to its trough-like shape the action of the wheel prevents upstream boats from getting full benefit of the water. It is proposed to improve this place by cutting through the bar below the island, thus allowing boats to pass into this deep water opposite its lower end. Between this point and the deep water above the shoalest water found was 4 feet.

16. *Log Cabin Rapid* (*32.81 miles below Lewiston*).—It has a length of 0.45 of a mile and a fall of 3.3 feet, or at the rate of 7.33 feet per mile, and has a current of 5.10 miles per hour. By following a tortuous channel a depth of 3 feet was found. Just above the shoal the river, which has a width of about 700 feet, is divided by a low island about 300 feet wide and 1,500 feet long. Near the right shore the water passing to the right of this island has a width of about 250 feet and a depth of about 1.5 feet. This island terminates at its lower end in a shoal which extends across the river, giving a depth of 3 feet near the left bank. A dike, now in bad repair, has been built by the United States in previous years to prevent the water from passing behind this island and by throwing all the water into the main channel to increase its depth. The method of navigation employed with upstream boats has been to skirt the left shore until about opposite the lower end of the island, then turn abruptly toward the deeper water about midstream. A crib filled with rock has been erected near the left bank at the point where the turn is made to prevent boats from drifting upon the rocky shore. As the channel is so near the shore, this has always been a very difficult place to navigate, especially during high winds. The proposed improvement contemplates repairing the dike mentioned and cutting a straight channel 5 feet deep through the shoal.

17. *Almota Dead March* (*33.94 miles below Lewiston*).—It has a length of 0.92 of a mile, with a total fall of 5 feet. It has two pitches, one of which falls at the rate of 5 feet to the mile with a current of about 5 miles per hour, the other at the rate of 8.33 feet per mile with a current of 7 miles per hour. This last pitch is about 0.1 of a mile in length. The soundings showed a 3.6-foot channel at low water. The river has a low-water width of about 600 feet and a high-water width of about 1,500 feet. No difficulty is generally experienced in navigating this portion of the river, and no improvement is proposed at present.

*Almota* (*36.30 miles below Lewiston*).—A settlement on the right bank of Snake River and is the principal settlement between Lewiston and Riparia. The building of railroads on the table-lands back from the river on each side has robbed it of much of its importance, but large shipments of wheat are still made from this point. A current ferry is operated here, it being on the Pomeroy-Colfax wagon road.

18. *Ilia Bar* (*37.82 miles below Lewiston*).—The river at this point has a low-water width of about 1,000 feet and a high-water width of about 1,400 feet. Opposite the lower end of the shoal the river is divided by a large island, the main body of water flowing to the left and a stream about 250 feet wide and 1 foot deep flowing to the right. The shoal connects the upper end of the island with the left shore. This is not considered a difficult place. A 4-foot channel was found. No improvement is proposed at present.

19. *Ilia Rapid* (*38.13 miles below Lewiston*).—It has a length of 0.59 of a mile and a fall of 7.4 feet, or at the rate of 12.53 feet per mile, with a current of 7.6 miles per hour. The least depth of water found was 6 feet. At about the head of the rapid the river is divided by a large island which crowds the main body of water into a channel on the left about 330 feet wide. The channel, which keeps to the right of the island, is about 250 feet wide and 1 foot in depth. The only impediment to navigation at this point is the strong current. No improvement excepting the removal of one rocky bowlder is considered necessary.

*Ilia* (*38.57 miles below Lewiston*).—A small settlement on the left bank of the river, and is a wheat-shipping point of considerable importance.

20. *Lower Ilia Rapid* (*40.21 miles below Lewiston*).—It has a length of 0.12 miles and a fall of 1.4 feet, or at the rate of 11.67 feet per mile. There is no impediment to navigation at this place. The shoalest water found was 5 feet.

21. *Wades Rapid* (*42.61 miles below Lewiston*).—It has a total length of 0.59 of a mile and a total fall of 4.5 feet. The upper half falls at the rate of 9.1 miles per hour and has a current of 7 miles per hour. The lower half falls at the rate of 5.77 miles per hour. The river, which is about 900 feet wide just above the rapid, is divided by Atwood Island, which throws the main body of water into a channel on the right side about 300 feet wide. The channel on the left of the island is about 100 feet wide and 1.5 feet deep. The least water found on this rapid was 6 feet. The only impediment to navigation is the strong current. No improvement is proposed.

22. *Rapid No. 16* (*46.01 miles below Lewiston*).—It has a length of 0.27 of a mile and a fall of 2.3 feet, or at the rate of 8.52 feet per mile, with a current of 4.50 miles

per hour. The river has a width of about 600 feet. The least depth found was 5 feet. No obstruction to navigation was found here.

23. *Upper Penewawa Rapid* (*47.93 miles from Lewiston*).—It has a length of 0.33 of a mile and a fall of 3.3 feet, or at the rate of 9.17 miles per hour. It has a current of 7 miles per hour. The shoalest water found was 5 feet. The rapid is caused by an insufficient cross section, the river narrowing down to about 400 feet between low-water lines. No improvement is now needed at this place.

24. *Lower Penewawa Rapid* (*48.72 miles below Lewiston*).—It falls 1.5 feet in a distance of 0.20 of a mile, or at the rate of 7.5 feet per mile. The river has a width of about 600 feet and a depth of 6 feet. No improvement is necessary except removing two rocks, aggregating about 40 cubic yards.

*Penewawa* (*49.56 miles below Lewiston*).—A small settlement on the right bank of the river. It has a store, post-office, and hotel. A current ferry is operated here.

25. *Willow Rapid* (*50.74 miles below Lewiston*).—It has a total length of 0.66 of a mile, divided into two pitches. The first has a fall of 2.5 feet, or at the rate of 10 feet per mile, and a current of 8 miles per hour; the second has a fall of 2.8 feet, or at the rate of 6.83 feet per mile, and a current of 7.4 miles per hour. The least depth of water found was 6.5 feet. The river just above the rapid has a low-water width of about 800 feet. It is divided by an island which contracts the main channel to a width of about 300 feet. The main body of water flows to the right of the island. The channel to the left is about 30 feet wide and 1 foot deep. The only impediment to navigation at this place is the strong current, which, setting toward the head of the island on the left, sometimes necessitates the use of a line. No improvement is proposed.

*Central Ferry* (*56.57 miles below Lewiston*) is a current ferry at the crossing of a wagon road.

26. *Dead Man Rapid and Bar* (*56.86 miles below Lewiston*).—It has a length of 0.39 of a mile and a fall of 4.4 feet, or at the rate of 11.28 feet per mile. It has a current of 6.10 miles per hour. The soundings gave a depth of 2.8 feet at the shoalest place. The river at this point is divided by Dead Man Island, the main channel, about 600 feet wide, going to the right. The channel passing to the left is about 200 feet wide and 1.3 feet deep. Dredging to 5 feet depth will be necessary.

27. *Diamond Crossing* (*58.32 miles below Lewiston*).—It is a long, diagonal bar extending from New York Bar on the left to the right bank. Three feet was the least depth found at this shoal. To secure a 5-foot channel it will be necessary to dredge.

28. *New York Bar Rapid* (*59.96 miles below Lewiston*).—It has a length of 0.44 of a mile, and a fall of 3.80 feet, or at the rate of 8.64 feet per mile. It has a current of 7 miles per hour. The least depth found here was 6.5 feet. The river above the rapid has a width of about 1,200 feet. It is divided by a low island about 800 feet wide, the main body of water flowing to the right through a channel about 400 feet wide. The channel to the left is about 50 feet wide. The rapid is the result of this narrowing of the waterway. The strong current is the only impediment to navigation. No improvement is proposed.

29. *Upper Goose Island Rapid* (*63.76 miles below Lewiston*).—It has a length of 0.47 of a mile and a fall of 4.3 feet, or at the rate of 9.15 feet per mile, with a current of 7 miles per hour. Three and five-tenths feet was the least depth found. Just above the rapid the river has a width of 1,300 feet and is here divided by the upper island of the group known as Goose Islands, which extends down the river for about 4 miles. These islands are three in number, the most elevated being about 16 feet above low water, the river at this point being 2,000 feet wide. The main channel keeps near the right bank and is about 400 feet in width. The channel on the left of this upper island is about 475 feet wide and has a depth of 5 feet. This is again divided. One branch, bearing to the right, passes between the upper island and the second of the group. This channel has a width of about 200 feet and a depth of 1 foot. The channel which keeps to the left has a width of about 250 feet and a depth of 1.5 feet. It has a very strong current and is blocked with many bowlders. It is not considered necessary, however, to make any improvement at this place at this time.

30. *Goose Island Bar* (*64.60 miles below Lewiston*).—This bar has formed in the pool between upper Goose Island Rapid and Goose Island Rapid proper and near the head of the latter. The water on the bar has a depth of 2 feet. The river here has a width of about 1,800 feet and is divided by the lower island of the Goose Island group, the upper end of this island being about opposite the bar. A shallow channel flows between the second of the group and this lower island about 400 feet wide and 1 foot deep. Two dikes have been constructed across this channel for the purpose of contracting the flow of water over the bar. The first built was placed across the channel at a point about 300 feet back of the shoulders of the two islands. This dike

is in bad repair. The last constructed is on a line between the shoulders of the islands, but lacks about 500 feet of connecting them. The improvement proposed for this place is to complete the last-mentioned dike and cut a channel 60 feet wide and 5 feet deep through the bar.

*31. Goose Island Rapid (64.67 miles from Lewiston).*—It has a total length of 0.36 of a mile and a total fall of 5.3 feet at its steepest place. It falls at the rate of 29.17 feet per mile, with a current of 8.8 miles per hour. The shoalest water found over this rapid was 6 feet. The river is here divided by the lower island of the Goose Island group, the main body of water flowing through a channel on the right about 200 feet wide. The river at this point has a high-water width of about 1,800 feet, there being a low bar on the right about 1,100 feet wide. No improvement is contemplated at this rapid.

*32. Little Goose Island Rapid (67.75 miles from Lewiston).*—It has a length of 0.35 of a mile and a fall of 3.6 feet, or at the rate of 10.28 feet per mile, and a current of 5.3 miles per hour. The shoalest water found was 3 feet. The river at this point has a width of about 1,500 feet and is divided by Little Goose Island, the main body of water flowing to the right in a channel about 550 feet wide. The branch flowing to the left is about 100 feet wide and 1.5 feet deep. Near the right bank of the main channel there are many sunken rocks. The steamer channel lies near the right bank of the island. No improvement is considered necessary at this place at the present time.

*33. Little Goose Island Bar (68.50 miles below Lewiston).*—It is a continuation of Little Goose Island. It begins at the lower end of the island and crosses the river diagonally, connecting with the right bank of the river about 1,500 feet below. The river at this place is about 1,200 feet wide. The water has a depth of 3 feet at its shoalest place. It is proposed to improve at this place by dredging a channel 60 feet wide and 5 feet deep through the bar.

*34. Rapid No. 24 (69.01 miles below Lewiston).*—This rapid has a length of 0.47 mile and a fall of 3 feet, or at the rate of 6.38 feet per mile, and a current of 6.5 miles per hour. The least depth found was 6.5 feet. The river at this point has a width of about 550 feet. It is flanked on the right by a low gravel bar about 800 feet wide. No impediment to navigation was found at this place.

*35. Upper Riparia Rapid (71.03 miles from Lewiston).*—It has a length of 0.29 of a mile and a fall of 3 feet, or at the rate of 10.35 feet per mile, and a current of 6.10 miles per hour. The least depth found was 7 feet. The river is here divided by McGuires Island, the main body of water flowing to the right through a channel about 400 feet wide. The channel is about 200 feet wide and 1 foot deep. No improvement is necessary at the present time.

*Riparia Bridge (72.85 miles from Lewiston and 73.10 miles from initial point of survey).*—This is the Snake River crossing of the Spokane Branch of the Oregon Railroad and Navigation Company's railroad. It has a length of 1,008 feet and a drawspan at the south end of 350 feet. Its grade is 38.1 feet above low water and 13 feet above high water. This is the initial point of the survey made of Snake River in 1897 from Riparia to the Columbia River, total length, 66.7 miles; Lewiston to this bridge, 72.85 miles; Lewiston to mouth of river, 139.55 miles.

*Riparia (end of survey, 73.25 miles from Lewiston and 73.5 miles from initial point of survey).*—A station on the Spokane Branch of the Oregon Railroad and Navigation Company's railroad. At this place all freight to and from river points between Lewiston and Riparia is transferred to rail, it being the lower terminus of the steamboat line to Lewiston.

The vessels now in Snake River, between Lewiston and Riparia, are all stern-wheel, flat-bottomed boats, a list of which, with their dimensions, is as follows:

| | Length. | Beam. | Depth. | Draft. | |
|---|---|---|---|---|---|
| | | | | Light. | Loaded. |
| | *Ft. in.* | *Ft. in.* | *Ft. in.* | *Ft. in.* | *Ft. in.* |
| Spokane | 160 4 | 38 6 | 6 3 | 2 0 | 3 8 |
| Lewiston | 165 0 | 34 4 | 5 3 | 1 0 | 3 6 |
| Almota | 157 0 | 36 0 | 5 0 | 1 8 | 3 6 |
| Norma | 160 0 | 32 6 | 5 6 | 1 11 | 3 4 |
| J. M. Hannaford | 191 0 | 36 4 | 6 0 | 27 | 3 9 |

The difficulties encountered arise in all cases from insufficient depths, occasional obstructing bowlders, and swift currents. Near low-water stages the steamers find it necessary at present to lay out ropes fastened to trees or to posts conveniently placed and haul themselves with steam windlasses over shoal places and through rapids too swift to be navigated otherwise. The boats being all flat-bottomed and the bars in this part of the river being all sand and gravel, this can be done without damage until the depth of water becomes insufficient, when navigation ceases. The dimensions of the above steamers are said to be those found best by experience for the conditions to be met in this river, and will not likely change much in the future unless the conditions are decidedly altered.

The comparatively large cross section of the river, the large discharge (22,000 feet per second), and the relatively high average slope (2.67 feet per mile) render the effect of the proposed dredged channels unimportant in changing the area of cross section so as to injuriously alter the currents or levels above, especially as the depth of cut to obtain 5 feet at low water is in most cases slight and not over 3 feet at the worst places. The dikes proposed do not increase the currents above what can be easily ascended by the present boats. The river bottom at all these special places is composed of coarse sand and gravel and small cobblestones which, if not found practicable to remove by increasing the currents by contracting dikes, can probably be easily dredged with a grapple bucket operated by a hoisting engine from a small derrick scow, especially if the bottom should be first loosened with small charges of explosives. In former years a heavy scraper towed by a steamer gave fairly satisfactory results in scraping bars.

A depth of 5 feet at low water has been selected in the project for the improvement of the river below Riparia (see House Doc. No. 411, Fifty-fifth Congress, second session), and any extensive improvement above Riparia to be effective should provide no less depth than this over all the above-named shoals. The thorough improvement of this section would therefore probably require a deepening of the channel through all these shoal places, the construction of a number of deflecting dikes to secure and maintain the depths, and the removal of all the bowlders and rocky points likely to interfere with vessels at low water.

The navigation of this section of river, however, is at present limited to one vessel each way daily, and it is not deemed advisable to include more points for improvement at the present time than necessary to relieve the most troublesome places. Low-water periods are of short duration, and present conditions are satisfactory except at low stages. For these reasons the extent of improvement proposed in this report provides only for the following, the dredged channels being 5 feet deep at low water and in most cases 60 feet wide:

| | | |
|---|---|---|
| Dry Gulch Shoal, 2,000 cubic yards gravel dredging, at 45 cents per cubic yard | | $900 |
| Steptoe Rapid, 600 cubic yards gravel dredging, at 45 cents per cubic yard | | 270 |
| Little Pine Tree Shoal, 1,700 cubic yards gravel dredging, at 45 cents per cubic yard | $765 | |
| Little Pine Tree Shoal, 900 cubic yards bowlder-gravel dredging, at $1 per cubic yard | 900 | |
| | | 1,665 |
| Rapid No. 8, 30 cubic yards bowlder-rock excavation, at $5 per cubic yard | | 150 |
| Granite Point Rapid, 50 cubic yards bowlder-rock excavation, at $5 per cubic yard | | 250 |
| Ofields Bar, 2,700 cubic yards gravel dredging, at 45 cents per cubic yard | | 1,215 |

| | | |
|---|---|---|
| Log Cabin Rapid, 4,200 cubic yards gravel dredging, at 45 cents per cubic yard | $1,890 | |
| Log Cabin Rapid, 900 tons rock in dike, at $1.50 per ton | 1,350 | $3,240 |
| Ilia Rapid, 30 cubic yards bowlder-rock excavation, at $5 per cubic yard | | 150 |
| Lower Penewawa Rapid, 40 cubic yards bowlder-rock excavation, at $5 per cubic yard | | 200 |
| Dead Man Rapid and Bar, 4,800 cubic yards gravel dredging, at 45 cents per cubic yard | | 2,160 |
| Dead Man Crossing, 5,300 cubic yards gravel dredging, at 45 cents per cubic yard | | 2,385 |
| Goose Island Bar, 2,200 cubic yards gravel dredging, at 45 cents per cubic yard | $990 | |
| Goose Island Bar, 1,500 tons rock in dikes, at $1.50 per ton | 2,250 | 3,240 |
| Little Goose Island Bar, 3,500 cubic yards gravel dredging, at 45 cents per cubic yard | $1,575 | |
| Little Goose Island Bar, 1,800 cubic yards bowlder-gravel dredging, at $1 per cubic yard | 1,800 | 3,375 |
| Superintendence, office expenses, and contingencies | | 3,800 |
| Total | | 23,000 |

The bottom of the river changes somewhat during each high water, and the large bowlders occasionally brought down by ice and high water will require work from time to time in the future to keep the improved channels clear. For these reasons a small amount should be available every two years for maintenance.

The estimate of cost of the proposed work is therefore as follows:

| | |
|---|---|
| Dredging cobblestone gravel at two places, 2,700 cubic yards, at $1 per cubic yard | $2,700 |
| Dredging gravel at nine different places, 27,000 cubic yards, at 45 cents per cubic yard | 12,150 |
| Riprap stone placed in dikes at two different places, 2,400 cubic yards, at $1.50 per cubic yard | 3,600 |
| Blasting bowlders, 150 cubic yards, at $5 per cubic yard | 750 |
| Superintendence and contingencies | 3,800 |
| Total | 23,000 |

To this should be added $5,000 for maintenance every two years.

If this improvement should be made it would be all the work throughout the whole river that the present necessities of navigation urgently require. If the obstructions in the Columbia River between The Dalles and Celilo, Oreg., should some day be removed and the large vessels used in the lower Columbia thus permitted to reach Snake River, or if for any other reason navigation should increase in volume and the length of the river now used should be extended, further and more extensive work may be needed in the Snake River, both above and below Riparia. Both the Northern Pacific Railway Company and the Oregon Railroad and Navigation Company have railways surveyed between Lewiston and Riparia connecting with their existing lines, and it is believed a few years more will see at least one railroad completed along this portion. In this case the Snake River, at least until the Columbia between The Dalles and Celilo is opened to navigation, will likely lose much, if not all, of its importance as a means of communication and transportation.

For the above reasons it is thought that any more extensive or costly improvements than above estimated for should not be undertaken at the present time, but should be delayed until such time as the need for further work is more evident. No work should be done below Riparia until there is sufficient necessity for the use of this part of the river to justify the expenditure.

*Recommendations.*—In my opinion the Snake River is unworthy of improvement at the present time beyond the work outlined above. The portion between Riparia and Lewiston is, in my opinion, worthy of limited improvement by the United States at the present time to the extent only of the work above described.

Very respectfully, your obedient servant,

WM. W. HARTS,
*Captain, Corps of Engineers.*

Brig. Gen. JOHN M. WILSON,
*Chief of Engineers, U. S. A.*

(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, PACIFIC DIVISION,
*San Francisco, Cal., November 20, 1900.*

Respectfully forwarded to the Chief of Engineers United States Army, with the views and recommendations of the district officer concurred in.

S. M. MANSFIELD,
*Colonel, Corps of Engineers,*
*Division Engineer.*

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## V V 18.

### ESTABLISHMENT OF HARBOR LINES IN COOS BAY, OREGON.

MARSHFIELD, OREG., *May 26, 1899.*

DEAR SIR: The following resolution was passed by the Coos Bay Chamber of Commerce at a special meeting held Thursday, the 18th of May, 1899:

"Resolved that this body petition the Secretary of War, through the United States engineer in charge of this department, asking for the establishment of a harbor line on Coos Bay within the incorporate limits of Marshfield, Coos County, Oreg., in pursuance of section 12 of an act making appropriations for river and harbors, of September 19, 1899, general laws of United States."

We would be glad if you will give this matter your attention.

Yours, very truly,

COOS BAY CHAMBER OF COMMERCE,
By JAS. H. FLANAGAN, *President.*

WM. W. HARTS, Esq.,
*Captain, Corps of Engineers, U. S. A.*

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### REPORT OF CAPT. WM. W. HARTS, CORPS OF ENGINEERS.

WAR DEPARTMENT, ENGINEER OFFICE, U. S. ARMY,
*Portland, Oreg., June 13, 1900.*

GENERAL: Respectfully referring to letter dated Office of the Chief of Engineers, U. S. Army, April 6, 1900, on the subject of the proposed establishment of harbor lines at the upper part of Coos Bay, Oregon. Copies of the blue print which accompanied indorsement from this office, dated February 2, 1900, were placed on exhibition in this office and with the Coos Bay Chamber of Commerce at Marshfield, Oreg. At the same time all interested persons were invited to inspect the blue print at either place, and to submit in writing any objections found to the proposed lines. This invitation to the public was in the form of news items inserted in Portland and Marshfield newspapers. Individual notices were also sent by mail to all persons known by this office to be owners of land affected, or otherwise specially interested, who might not see the notices in the Marshfield papers. The matter appears, therefore, to have been given ample publicity.

Only one objection to the proposed lines was received. The lines were slightly changed to overcome this single objection, and now appear to be satisfactory to the Coos Bay Chamber of Commerce and to all persons interested. The needs of navigation are also believed to be properly safeguarded. A tracing[1] and a description of the harbor lines, as changed and as now recommended for adoption, are forwarded herewith, with request that same be substituted for the blue print and description which accompanied indorsement from this office dated February 2, 1900.

Very respectfully, your obedient servant,

Wm. W. Harts,
*Captain, Corps of Engineers.*

Brig. Gen. John M. Wilson,
*Chief of Engineers, U. S. A.*

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*Description of the harbor lines recommended for Coos Bay from North Bend Point to "Bay City Lumber Mill."*

| Number of course | Description of course. | True bearing of course. | Length of course. |
|---|---|---|---|
| | Beginning at a point center of track on edge of the west abutment of the drawspan of the C. B. & R. R. R. crossing Coal Bank Slough. | | *Feet.* |
| 1 | A point 1,260 feet south and 400 feet west of Coast Survey Station Isthmus, and 120 feet south 80° 10′ west of dolphin of northwest corner of the O. C. & N. Co's. coal bunker. | N. 22° 14′ E ... | 425 |
| 2 | The southeast corner of the C. B. R. R. wharf | N. 60° 57′ W... | 960 |
| 3 | A point on the C. B. R. & E. R. R. & N. Co's. log boom | N. 36° 30′ W... | 510 |
| 4 | The southeast corner of the railroad bunker | N. 22° 20′ W... | 720 |
| 5 | The northeast corner of the railroad bunker | N. 4° 00′ W.... | 200 |
| 6 | A point 289 feet east of the east side of Pine street, at a point 69 feet south of southeast corner of Pine and C streets, Marshfield, Oreg. | N. 1° 00′ E .... | 800 |
| 7 | A point of the northeast corner of the town dock, foot of Third street, which is 186 feet east of northeast corner of Front and Third streets, Marshfield, Oreg. | N. 13° 45′ E.... | 1,425 |
| 8 | A point on the northeast corner of Holland Brothers's wharf | N. 9° 00′ E .... | 148 |
| 9 | A point 124 feet north and 1,350 feet east of Coast Survey Station, Marshfield hill; also 170 feet south 39° 10′ east of the northeast corner of the Cannery wharf. (The dolphin pile used as a point.) | N. 9° 00′ E .... | 677 |
| 10 | A point north 660 feet and 1,200 feet east of Coast Survey Station Marshfield hill. | N. 13° 40′ W... | 561 |
| 11 | A point 2,930 feet north and 995 feet west of Coast Survey Station Marshfield hill, and 810 feet south 33° 30′ east of red dolphin, at Stave Mill stake light. | N, 44° 14′ W... | 3,150 |
| 12 | A point on the southeast corner of the Stave Mill wharf | N. 14° 20′ W... | 1,466 |
| 13 | A point 600 feet south and 555 feet east of Coast Survey Station Porter. | N. 10° 32′ E ... | 4,256 |
| 14 | A point 510 feet east of Coast Survey Station Porter, and 20 feet east of a point 76 feet southerly from the northeast corner of the Porter Mill wharf. | N. 4° 18′ W.... | 602 |
| 15 | A point 820 feet north and 205 feet east of Coast Survey Station Dewey, and 365 feet south 10° 45′ east of center fender pile in Yarrow wharf, | N. 15° 00′ W... | 3,235 |
| 16 | A point 255 feet east of northeast corner of the North Bend store | N. 10° 42′ E ... | 4,228 |

[1] Not printed.

*Description of the harbor lines recommended for Coos Bay from North Bend Point to "Bay City Lumber Mill"*—Continued.

| Number of course | Description of course. | True bearing of course. | Length of course. |
|---|---|---|---|
| | | | *Feet.* |
| 17 | A point 560 feet east of Coast Survey Station Hay Barn | N. 4° 1′ W | 1,317 |
| 18 | At a point in Coos Bay 620 feet north of Coast Survey Station Hay Barn (the gable end of the North Bend Mill wharf house on North Bend Point). | N. 42° 00′ W | 835 |
| | Begining again at station 19 at the center of track on the edge of the east abutment of the drawbridge of the C. B. & R. R. R. crossing Coal Bank Slough. | | |
| 20 | To "dolphin" at the northwest corner of the O. C. & N. Co's coal bunker. | N. 23° 30′ E | 520 |
| 21 | Northeast corner of the above bunker | S. 81° 15′ E | 255 |
| 22 | A point 655 feet south and 1,555 feet east of Coast Survey Station Isthmus. | N. 68° 24′ E | 1,700 |
| 23 | A point 440 feet south and 153 feet east of the southeast corner of Holcomb's wharf. | S. 72° 02′ E | 930 |
| 24 | Northeast corner of E. B. Dean & Co.'s log boom on the west side of Isthmus Slough. | S. 11° 20′ E | 1,125 |
| 25 | A point on said boom | S. 14° 53′ E | 460 |
| 26 | A point on said boom | S. 9° 5′ E | 820 |
| 27 | Southeast corner of lower boom opposite Dean & Co.'s mill | S. 5° 52′ E | 520 |
| 28 | Northeast corner of E. B. Dean & Co.'s upper boom on west side of Isthmus Slough. | S. 8° 20′ W | 755 |
| | Beginning again at station 29 at the southwest corner of E. B. Dean & Co.'s mill wharf on the east side of Isthmus Slough. | | |
| 30 | Northwest corner of above wharf | N. 4° 32′ E | 465 |
| 31 | A point on E. B. Dean & Co.'s log boom on the east side of Isthmus Slough. | N. 14° 24′ W | 1,055 |
| 32 | A point 425 feet south and 495 feet east of southwest corner of Holcomb's wharf. | N. 6° 20′ W | 1,615 |
| 33 | Southwest corner of above wharf | N. 49° 4′ W | 652 |
| 34 | A point 337 feet south and 1,550 feet east of Coast Survey Station Isthmus. | N. 77° 3′ W | 760 |
| 35 | A point 460 feet south and 557 feet east of Coast Survey Station Isthmus. | S. 83° 10′ W | 995 |
| 36 | A point 815 feet south and 430 feet west of Coast Survey Station Isthmus, and 460 feet north 22° 46′ west of the northwest corner of the O. C. & N. Co.'s coal bunker. | S. 70° 10′ W | 1,060 |
| 37 | A point 495 feet south and 1,065 feet west of Coast Survey Station Isthmus; also 345 feet north 23° 18′ east of the southeast corner of railroad wharf. | N. 63° 00′ W | 710 |
| 38 | A point 1,437 feet west and 415 feet north of Coast Survey Station Isthmus; also 400 feet south 83° 47′ east of northeast corner of railroad bunker. | N. 22° 5′ W | 980 |
| 39 | A point 1,465 feet west and 787 feet north of Coast Survey Station Isthmus; also 500 feet north 47° 56′ east of northeast corner of railroad bunker. | N. 4° 42′ W | 370 |
| 40 | The southwest corner of the East Marshfield wharf | N. 24° 25′ E | 1,645 |
| 41 | A point 394 feet north and 2,125 feet east of Coast Survey Station Marshfield hill; also 930 feet north 80° 7′ east of northeast corner of Cannery dock. | N. 9° 7′ E | 1,470 |
| 42 | A point 247 feet west and 1,637 feet north of Coast Survey Station White's point. | S. 87° 22′ E | 1,845 |
| 43 | A point in Coos River 635 feet east and 1,370 feet north of Coast Survey Station Whites Point. | S. 73° 7′ E | 925 |
| | Beginning again at station 44 at Channel pile No. 17 on the north side of the entrance to Coos River, said pile being 635 feet east and 1,870 feet north of Coast Survey Station White's point. | | |
| 45 | Channel pile No. 5 | N. 79° 32′ W | 2,326 |
| 46 | A point 625 feet west and 110 feet north of 3 pile black dolphin, back range for Hogsback channel. | N. 68° 13′ W | 1,680 |
| 47 | A point 945 feet north and 1,435 feet west of above range dolphin | N. 44° 4′ W | 1,160 |
| 48 | A point 1,820 feet east of Station Stave Mill mill (stack) | N. 4° 34′ E | 2,140 |
| 49 | A point 1,490 feet east of Coast Survey Station Porter | North | 4,588 |
| 50 | A point 1,577 feet east and 755 feet south of Coast Survey Station Dewey | N. 15° 30′ W | 1,615 |
| 51 | A point 625 feet north and 1,145 feet east of Yarrow wharf (center fender pile). | N. 6° 40′ W | 2,580 |
| 52 | A point 2,235 feet north and 1,715 feet east of Yarrow wharf (center fender pile); also, 1,430 feet south 47° 5′ east of southeast corner of North Bend Mill wharf. | N. 19° 49′ E | 1,707 |
| 53 | A point on the west side of the north entrance to Coos River, and 2,370 feet east and 2,235 feet north of Yarrow wharf; also, 1,975 feet south 60° 2′ east of southeast corner of North Bend Mill wharf. | East | 655 |
| | Commencing again at station 54, a point 510 feet east of last point (No. 53), on the east side of the north entrance to Coos River. | | |
| 55 | A point on the south side of the entrance of Kentuck Slough and 1,727 feet east, and 292 feet south of Coast Survey Station Hay Barn. | N. 19° 57′ W | 2,750 |
| | Commencing again at station 56, a point on the north side of the entrance to Kentuck Slough, 225 feet north 19° 57′ west of last station (No. 55), and 1,650 feet east and 80 feet south of Coast Survey Station Hay Barn. (Stake.) | | |
| 57 | White Pile light (North Bend) | N. 19° 57′ W | 730 |
| 58 | Southwest corner of the Glasgow wharf | N. 55° 23′ W | 1,108 |

## LETTER OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
*Washington, June 22, 1900.*

SIR: The Coos Bay Chamber of Commerce having petitioned for the establishment of harbor lines on the upper part of Coos Bay, Oregon, the district engineer officer, Capt. W. W. Harts, Corps of Engineers, has given the subject careful consideration, and has submitted a tracing and description of the lines which in his opinion are essential to the preservation and protection of the harbor.

In report of the 13th instant, herewith, Captain Harts states that the lines adopted by him have been inspected by interested parties and that they appear to be satisfactory to all interests.

I recommend approval of the lines and that the Secretary place his approval on the tracing[1] which has been prepared for his signature.

Very respectfully, your obedient servant,

JOHN M. WILSON,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

Hon. ELIHU ROOT,
*Secretary of War.*

NOTE.—The lines referred to above and shown on the map mentioned were approved by the Secretary of War July 3, 1900, the approval being indicated on the map.

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[1] Not printed.

# APPENDIX W W.

## IMPROVEMENT OF WILLAMETTE AND LOWER COLUMBIA RIVERS AND TRIBUTARIES, OREGON AND WASHINGTON.

*REPORT OF CAPT. W. C. LANGFITT, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901, WITH OTHER DOCUMENTS RELATING TO THE WORKS.*

### IMPROVEMENTS.

1. Long Tom River, Oregon.
2. Willamette River above Portland, and Yamhill River, Oregon.
3. Operating and care of lock and dam in Yamhill River, Oregon.
4. Columbia and Lower Willamette rivers below Portland, Oregon.
5. Columbia River, Oregon, below Tongue Point.
6. Mouth of Columbia River, Oregon and Washington.
7. Clatskanie River, Oregon.
8. Lewis River, Washington.
9. Cowlitz River, Washington.
10. Construction of dredging plant for tributaries of Columbia River below the mouth of Willamette River.
11. Gauging Columbia River, Oregon and Washington.

United States Engineer Office,
*Portland, Oreg., July 18, 1901.*

General: I have the honor to transmit herewith annual report * * * for the fiscal year ending June 30, 1901, for works of river and harbor improvement in my charge.

Very respectfully, your obedient servant,

W. C. Langfitt,
*Captain, Corps of Engineers.*

Brig. Gen. G. L. Gillespie,
*Chief of Engineers, U. S. A.*

## W W 1.

### IMPROVEMENT OF LONG TOM RIVER, OREGON.

The location and plans of the work, with approved project of improvement and work done prior to the beginning of the present fiscal year, are all described in the summary of this report.

*Approved project.*—The project approved by the Secretary of War on May 27, 1899, was adopted in 1898. (See Annual Report of the Chief of Engineers for 1898, p. 3045.) It contemplates cutting overhanging trees from the banks and removing snags from the channel from its junction with the Willamette River up to the town of Monroe, about 10 miles from the mouth, with a view of securing a navigable channel on the higher stages of water during the rainy season.

The river and harbor act of March 3, 1899, transferred $3,000 of the balance remaining to the credit of appropriation for the improvement of the Willamette River above Portland to this work, and these funds have all been expended and project completed.

### OPERATIONS DURING THE FISCAL YEAR 1901.

The funds for this improvement had previously been expended and applied to completion of project as outlined. No work has therefore been done during the fiscal year. It is estimated that an annual expenditure of $500 applied to snagging will be sufficient for maintenance. While no deterioration has probably taken place, it is recommended that this amount be provided for in future appropriations for improvement of Willamette and Yamhill rivers.

The commerce has not increased over the first year and the actual cost of maintenance is still somewhat problematical. It may prove that the cost of maintenance is out of proportion to the commerce involved, in which case the expenditure will not be made. If, however, the cost of maintenance proves to be within due limits, the work can well be done in connection with that on the Willamette and Yamhill rivers. For this reason it is recommended that further appropriation for definite amounts to be expended on this stream be discontinued, provided that the small amount ($500), or so much thereof as may be needed, be expended annually from the general appropriation for improving Willamette and Yamhill rivers, Oregon.

*Money statement.*

| | |
|---|---|
| Amount (estimated) required for completion of existing project | Indefinite |
| Amount that can profitably be expended in fiscal year ending June 30, 1903, for maintenance of improvement | $500.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | |

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## W W 2.

### IMPROVEMENT OF WILLAMETTE RIVER ABOVE PORTLAND, AND YAMHILL RIVER, OREGON.

The location and plan of the work, with approved project of improvement and work done prior to the beginning of the present fiscal year, are all described in the summary of this report.

*Approved project.*—The present project is an extension of the project of 1892 (see Annual Report of the Chief of Engineers for 1897, Part I, p. 507), and contemplates the improvement of the Willamette River from Portland to Eugene (estimated cost, $131,697) and the construction of a lock and dam in the Yamhill River (estimated cost, $69,000). All of the funds have been appropriated.

### OPERATIONS DURING THE FISCAL YEAR 1901.

*Willamette River.*—The beginning of the fiscal year found the snag boat and plant out of commission and no work in progress on the Willamette because of the exhaustion of funds for this work. An allotment of $5,000 from the emergency river and harbor act of June 6, 1900, was made available in July, and snagging operations were then begun between Salem and Portland with small crew equipped with blasting materials, small boats, pile driver, scow, and hand tools.

During August some 67 snags and overhanging trees were removed from the channel and banks and a number of hardpan lumps were blasted from the channel.

During August and September the river reached its low-water stage, and shoals were formed near Lambert's bend and Eldridge's landing, respectively, 17 and 20 miles below Salem, which threatened to close navigation between Salem and Portland. Temporary wing dams of piles, brush, and gravel were constructed at these points and sufficient depth maintained to enable the lightest draft boats to make regular daily trips, though boats of 3 feet draft were obliged to transfer freight at Eldridge Bar during the period of extreme low water in September. During the low-water season extensive repairs were made also to the existing dams at head of Lambert's slough, Ash Island, and Feaster's bend in this section of the river and to the revetment in the bend above Corvallis in the upper river. All active operations on the river were suspended October 9, owing to the exhaustion of funds.

*Snagging Yamhill River.*—During early part of September, prior to completion of the lock and dam in Yamhill River, the stretch of river between the lock and McMinnville was cleared of leaning trees and small snags. After completion of the lock and dam, the snag boat *Mathloma*, in commission for work on Lower Willamette and Columbia rivers, removed such snags as could not be handled by the land crew.

In February, at the subsidence of the highest water of the year, several slides occurred on the Yamhill River between McMinnville and the mouth which seriously obstructed navigation. These were removed as far as practicable by crew with hand tools and powder.

The following is a summary of the work performed by snagging crew on the Willamette and Yamhill rivers during the year:

| | |
|---|---|
| Snags and trees removed from channel and banks | 254 |
| Hardpan blasted ..........cubic yards.. | 100 |
| Powder used ..........pounds.. | 900 |

The following is a tabular statement giving the location of dams constructed and repaired on the Upper Willamette River during the fiscal year 1901, with length, quantities of material and labor, and total cost:

| | Lamberts Bend Dam No. 1. | Lamberts Bend Dam No. 2. | Eldridge bar dam. | Lamberts Slough dam (repairs). | Ash Island dam (repairs). | Corvallis revetment (repairs). | Feasters Bend (repairs). | Total. | Cost per unit. | Total cost. |
|---|---|---|---|---|---|---|---|---|---|---|
| Length..........feet.. | 455 | 300 | 850 | 40 | 200 | 165 | 300 | 2,310 | ........ | ........ |
| Piles..........linear feet.. | 630 | 800 | 900 | ...... | ...... | ........ | 1,000 | 3,330 | $0.00½ | $16.65 |
| Brush..........cords.. | 147 | 56 | 403 | 14 | 132 | 183 | 150 | 1,085 | *a* .10 | 108.50 |
| Gravel..........sacks.. | 485 | ...... | 980 | ...... | ...... | 100 | ........ | 1,565 | *a* .06 | 93.90 |
| Loose gravel..........tons.. | 560 | ...... | 760 | 40 | 50 | 240 | 260 | 1,910 | ........ | ........ |
| Iron..........pounds.. | 50 | ...... | 40 | ...... | 60 | 100 | 100 | 350 | .05 | 17.50 |
| Bale rope..........do.... | 210 | ...... | 500 | 30 | 200 | 250 | 100 | 1,290 | .10 | 129.00 |
| Lumber..........feet B M.. | ...... | ...... | ...... | ...... | ...... | 1,000 | ........ | 1,000 | 8.00 | 8.00 |
| Wire rope..........linear feet.. | ...... | ...... | ...... | ...... | ...... | 766 | ........ | 766 | .12½ | 95.75 |
| Labor..........days.. | 260 | 65 | 625 | 15 | 225 | 150 | 100 | 1,440 | 2.00 | 2,880.00 |
| Total.......... | ...... | ...... | ...... | ...... | ...... | ........ | ........ | ........ | ........ | 3,349.30 |

*a* Stumpage.

Cost per foot of work (including repairs), $1.45.

*Lock and dam, Yamhill River.*—The approved project providing for the construction of a lock and dam on Yamhill River was based upon a report to the Chief of Engineers dated March 6, 1895 (Annual Report Chief of Engineers, 1895, p. 3602), and the appropriation for its construction was provided for by river and harbor act June 3, 1896 (Annual Report Chief of Engineers, 1897, p. 507).

The contract for constructing the lock and dam was let March 11, 1898, to Normile, Fastabend & McGregor, of Astoria, Oreg., and required full completion of work by December 31, 1898. This time of completion was extended to November 1, 1899, and because of failure of the contractors to complete the work at that time was again extended to October 1, 1900.

At the beginning of the fiscal year the work under this contract was in the following condition:

Lock walls, gates, valves, etc., keeper's dwelling, and lock house completed; timber revetments and grading of banks on west side three-quarters completed; pile section of main dam in course of construction, one-third completed; crib section of main dam, revetments, embankments, and bank protection on east side not started.

The cofferdams above and below the crib section of main dam were completed August 1, and the flow of river diverted through the lock chamber. The preparation of the soapstone foundation for the dam was then begun, and the entire structure, including concrete base, timber cribbing, and stone filling, was completed September 1, 1900.

September 15 the flow of river through lock chamber was closed, and on September 19 the water began to flow over the dam.

All work under contract was completed September 22, 1900, and works were formally turned over to the United States.

The lock was officially opened to navigation September 24, 1900, and since that date has been in operation, except at such times as it was flooded by high water.

For report of operations since date of opening, attention is respectfully directed to report on "Operating and care of Yamhill Lock, Oregon."

This work during the past fiscal year has been in the very efficient charge of Mr. D. B. Ogden, assistant engineer.

The following is a tabulated statement of the work performed and materials furnished under the contract from March 11, 1898, to September 23, 1900, together with the total cost thereof:

| Materials. | Furnished during fiscal year 1899. | Furnished during fiscal year 1900. | Furnished during fiscal year 1901. | Total furnished under contract. | Price per unit. | Total cost. |
|---|---|---|---|---|---|---|
| Excavation, earth, at lock and dam, cubic yards | 13,995 | 82 | 418 | 14,495 | $0.65 | $9,421.75 |
| Excavation, rock, at Martins shoal, cubic yards | 512.2 | | | 512.2 | 5.75 | 2,945.15 |
| Embankment ..... cubic yards | 4,328 | 815 | 1,573 | 6,716 | .15 | 1,007.40 |
| Piles ..... linear feet | 20,718 | 6,168 | 301 | 27,187 | .13 | 3,534.31 |
| Lumber, rough ..feet, board measure | 117,016 | 59,475 | 172,395 | 348,886 | 12.00 | 4,186.63 |
| Lumber, gates, etc ..... do | | 22,182 | | 22,182 | 32.00 | 709.82 |
| Concrete ..... cubic yards | 5,285 | 2,339 | 155 | 7,779 | 5.44 | 42,317.76 |
| Cast iron ..... pounds | 3,300 | 28,829 | 2,813 | 34,942 | .04 | 1,397.68 |
| Wrought iron ..... do | 9,892 | 22,208 | 14,653 | 46,753 | .04 | 1,870.12 |
| Stone ..... cubic yards | | 57 | 1,767 | 1,824 | 1.25 | 2,280.00 |
| Brush ..... cords | | | 100 | 100 | 1.35 | 135.00 |
| Drain pipe ..... linear feet | 796 | | | 796 | .20 | 159.20 |
| Keeper's dwelling | | | | | | 2,200.00 |
| Total | | | | | | 72,164.82 |

During the thirty years since beginning operations on the Willamette the records of this office show a total of 44,610 linear feet dams and shore revetment constructed, 36,255 snags and trees and some 1,500 cubic yards of rock and hardpan removed from the channel, and a lock and dam built on Yamhill River.

Of the 44,610 linear feet of dam constructed there possibly remains in evidence about 25,000 linear feet, the balance having been washed away, or covered over and left inland by changes in the ever-shifting channel of the Willamette.

While without question the construction of these controlling works has afforded relief and extended the navigation period during the years of improvement, experiment has demonstrated that the physical features of the upper river, and the small volume of water, together with the constant movement of the gravel bed of the river throughout the entire 172 miles under improvement, make impracticable, at any reasonable cost, the attainment in all sections of a permanent and stable channel with depths outlined in the approved project.

This is especially true as regards the low-water depth of "2 to 2½ feet" called for by the project between Corvallis and Eugene, owing to the steep slope of the river bed on this stretch, there being a fall of 212 feet in 52 miles, an average of 4 feet per mile. Experience on this stretch has proven that even where the required depth has been obtained, through confinement of flow and sacrifice of length, the increased velocity of the current has become almost as great a hindrance as the shoal was before removal.

The channel of the river changes greatly in location from year to year, cut-offs frequently occur, and the whole regimen of the river is disturbed for long distances above and below. The banks are not stable, and to obtain permanent location of channel would require enormous amounts of costly bank protection.

It is believed advisable that future operations above Corvallis be confined mainly to snagging with a view of providing a clear channel for high-water navigation and that efforts to secure low-water navigation be restricted to the stretch between Corvallis and Portland. This is thought to be practicable under a continuous system of snagging, dredging, and occasional dam construction, as the average fall of river per mile below Corvallis is less than 1.5 feet.

The shoals left at low water, while numerous, are usually of loose gravel and sand and of no great width. For this reason it is believed that immediate relief could be afforded to low-water navigation with as lasting benefit as under the present system, and at less cost, by means of dredging. A narrow cut would frequently maintain itself throughout a season, and in doubtful cases the work of the dredge could be maintained and even augmented by a deflecting dam of temporary nature.

It is estimated that a light-draft dipper or clam-shell dredge of such pattern as would be suitable for the work in question can be built for $20,000. The recommendation for its construction was submitted by the district officer May 16, and concurred in by the Chief of Engineers under date of May 27, 1901 (E. D. 16087/13). The item is therefore incorporated in this report and included in the money statement.

It is estimated that $25,000 will be required for removal of snags, logs, etc., for repairs to existing works, and for probable dredging to secure depths at shoal places. It is also estimated that the sum of $25,000 will be required for removal of snags, logs, etc., which may be brought into the stream between the present time and June 30, 1903, and for supplemental dredging and repairs. The sum of $50,000 is accordingly named in the money statement for maintenance, and with $20,000 as estimated cost of dredge the amount that can profitably be expended in fiscal year ending June 30, 1903, is $70,000.

The small available balance is insufficient for any further work than to care for plant, and future appropriations are to be applied to maintenance, as above.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $15,718.17 |
| Allotted from emergency act of June 6, 1900 | 5,000.00 |
| | 20,718.17 |
| June 30, 1901, amount expended during fiscal year | 19,777.47 |
| July 1, 1901, balance unexpended | 940.70 |
| July 1, 1901, outstanding liabilities | 50.00 |
| July 1, 1901, balance available | 890.70 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, for maintenance of improvement, in addition to the balance unexpended July 1, 1901<br>Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | 70,000.00 |

APPROPRIATIONS.

| Act of— | |
|---|---|
| March 3, 1871 | $16,000 |
| March 3, 1873 | 3,000 |
| June 23, 1874 | 7,500 |
| March 3, 1875 | 25,000 |
| August 14, 1876 | 20,000 |
| June 18, 1878 | 20,000 |
| March 3, 1879 | 12,000 |
| June 14, 1880 | 12,000 |
| March 3, 1881 | 15,000 |
| August 2, 1882 | 5,000 |
| July 5, 1884 | 10,000 |
| August 5, 1886 | 10,000 |
| August 11, 1888 | 29,000 |
| September 19, 1890 | 11,000 |
| July 13, 1892 (of which $3,000 was allotted to Yamhill River) | 30,000 |

| Act of— | |
|---|---|
| August 18, 1894 (of which $2,000 was allotted to Yamhill River) | $23,000 |
| June 3, 1896 (Willamette and Yamhill rivers) | 40,000 |
| June 4, 1897 (Willamette and Yamhill rivers) | 160,000 |
| Total | 448,500 |
| Allotted from emergency act June 6, 1900 | 5,000 |
| Total | 453,500 |
| March 3, 1899, transferred to Long Tom River, Oregon | 3,000 |
| Total | 450,500 |

For list of steamers plying these waters see report for improving Columbia and Lower Willamette rivers below Portland, Oreg.

COMMERCIAL STATISTICS.

These rivers are in the collection district of Willamette. The ports of entry are Portland and Astoria, Oreg. The nearest light-house is at the mouth of the Columbia River.

The following statement of traffic on the Willamette River above Portland has been compiled from reports of the various steamers and transportation companies doing business on this part of the river during the year ending December 31, 1900.

| | Tons. | | Tons. |
|---|---|---|---|
| Wheat | 8,829 | Merchandise | 60,758 |
| Other cereals | 6,151 | Fish | 90 |
| Flour | 7,216 | Stone | 45,068 |
| Lumber (18,315,552 feet B. M.) | 23,810 | Hay | 311 |
| Shingles | 15 | Potatoes | 3,274 |
| Logs (7,200,000 feet B. M.) | 18,000 | Hops | 798 |
| Cattle and horses (number 692) | 276 | Wood (4,694 cords) | 7,041 |
| Sheep and hogs (number 5,084) | 381 | | |
| Coal | 24 | Total | 182,451 |
| Wool | 416 | | |

Passengers carried, 47,324.

The canal and locks at Oregon City overcoming the falls of the Willamette River are owned and operated by the Portland General Electric Company, and the following is a statement for the year ending December 31, 1900, of the traffic passing through them:

| | | | | | |
|---|---|---|---|---|---|
| Grain | tons | 3,717 | Paper | tons | 32,827 |
| Flour and mill stuff | do | 4,687 | Piling | linear feet | 76,500 |
| Coal | do | 150 | Lumber | feet B. M. | 2,037,126 |
| Wool | do | 648 | Logs | do | 6,576,702 |
| General merchandise | do | 16,879 | Wood | cords | 6,280 |
| Potatoes | do | 3,969 | Passengers | number | 25,123 |
| Hops | do | 1,577 | Cattle and horses | do | 927 |
| Paper stock | do | 908 | Sheep and pigs | do | 3,709 |
| Pulp | do | 4,537 | | | |

## W W 3.

### OPERATING AND CARE OF LOCK AND DAM IN YAMHILL RIVER OREGON.

The Yamhill lock is situated on the Yamhill River near Lafayette, Oreg., about 8 miles above its junction with the Willamette, and some 10 miles below the town of McMinnville, the head of steamboat navigation.

The lock and dam were constructed under contract dated March 11, 1898, and completed September 22, 1900.

For original project and details of construction, attention is respectfully invited to accompanying report on "Improvement of Willamette River, above Portland, and Yamhill River, Oregon."

The lock was formally opened to navigation September 24, 1900, immediately following its completion, and during the remainder of the fiscal year has been in operation two hundred and two days, and been closed on account of high water seventy-eight days.

Ten freshets occurred in the Yamhill between November and April, the effects of which have shown the banks adjacent the lock and dam to be much less stable, and the conditions during these periods much more severe than was anticipated in the preparation of the original plan of construction.

During November and early part of December two rapid freshets occurred, each doing more or less damage to the bank riprap below the dam, and to the new earth embankment on the west side below the lock.

At the subsidence of December freshet a 40-foot section of the bank riprap immediately above the root of the dam slid in mass into the river, and investigation revealed that a subsurface upstream eddy had scoured away much material from the face of the dam, and undermined the timber revetment at toe of riprap. As this action of the current seriously threatened to undermine the dam, 150 cubic yards of stone were deposited along the face of dam and at foot of slope, and further scour thus prevented.

During the latter part of December a third freshet occurred, carrying the river 10 feet over the lock walls, and in its subsidence did much injury to the fresh earth embankment behind the land wall of the lock, scouring a channel some 25 feet wide and 9 feet deep along the entire length of the wall. This embankment was finished so late in the season that it was unprotected by turf and offered little resistance to a strong upstream eddy which flowed along the wall as the river fell.

The greatest rise of river since 1894 occurred January 12 to 19, during which time the river registered 46 feet above low water, or 25 feet over the lock walls, but as this flood was general the back water from the Willamette deadened the current in the Yamhill, and thus prevented disastrous scour which would otherwise have occurred on its rise and fall.

One general freshet occurred during February, carrying the river 11 feet over the walls, and during March and April there were four local rises which carried the river each time above the lock walls. During each of the last-named freshets the current was very swift and did more or less damage to the bank and revetment at head of lock, the embankment along the land wall, and to the bank on the east side below the lock.

Throughout the winter a small crew has been kept continuously employed and every effort has been made to check the scour of the banks and make such repairs as the stage of river and materials at hand would permit. This work, however, has been expensive and necessarily of the most temporary character, as the only materials available for immediate repairs or protection were sacks filled with the sedimentary soil from the banks, which readily dissolves under action of current and could be held in sacks only by a liberal mixing with straw. No gravel or stone is obtainable within 5 miles of the lock, and the almost impassable condition of the roads after the winter rains set in made delivery of stone out of the question.

During the coming low-water season it is proposed to extend the concrete wing wall at head of lock, regrade and riprap the entire west bank, extend the sheet-pile abutment and increase stone filling at the root of dam, extend riprap on east side above dam and regrade and replace riprap below dam. This work is provided for by allotment of $23,200 under date of May 24, 1901.

### ALLOTMENTS.

| | |
|---|---|
| September 19, 1900 | $1,460 |
| January 18, 1901 | 1,500 |
| May 24, 1901 | 23,200 |
| Total | 26,160 |

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended (amounts allotted) | $26,160.00 |
| June 30, 1901, amount expended during fiscal year | 2,313.40 |
| July 1, 1901, balance unexpended | 23,846.60 |
| July 1, 1901, outstanding liabilities | 664.70 |
| July 1, 1901, balance available | 23,181.90 |

### *Statement of expenditures made in operating and caring for lock and dam in Yamhill River, Oregon, during the fiscal year 1901, submitted in compliance with the river and harbor act of July 5, 1884.*

| | |
|---|---|
| Labor | $1,660.46 |
| Materials for repairs | 157.05 |
| Tools, fuel, oil, etc | 75.52 |
| Superintendence and contingencies | 420.37 |
| Total | 2,313.40 |

### COMMERCIAL STATISTICS.

*Statement showing traffic through lock and dam in Yamhill River since opening, September 22, 1900.*

[September 22, 1900, to June 30, 1901.]

| Date. | Lock open. | Lock closed. | Number lockages. | Time operating. | | Registered tonnage. | Freight carried. | Passengers carried. |
|---|---|---|---|---|---|---|---|---|
| 1900. | *Days.* | *Days.* | | *h.* | *m.* | | *Tons.* | *Number.* |
| September | 7 | | 10 | 3 | 09 | 1,386 | 4 | 623 |
| October | 30 | 1 | 28 | 6 | 32 | 5,148 | 68 | 176 |
| November | 20 | 10 | 19 | 4 | 34 | 3,762 | 56 | 119 |
| December | 17 | 14 | 13 | 3 | 04 | 3,169 | 34 | 93 |
| 1901. | | | | | | | | |
| January | 11 | 20 | 11 | 2 | 24 | 2,178 | 14 | 41 |
| February | 15 | 18 | 12 | 3 | 54 | 3,168 | 50 | 69 |
| March | 19 | 12 | 16 | 3 | 25 | 3,564 | 84 | 85 |
| April | 22 | 8 | 20 | 4 | 19 | 3,800 | 111 | 64 |
| May | 31 | | 43 | 17 | 49 | 6,178 | 544 | 455 |
| June | 30 | | 53 | 18 | 22 | 6,614 | 777 | 285 |
| Total | 202 | 78 | 225 | 67 | 32 | 38,967 | 1,742 | 2,010 |

## W W 4.

## IMPROVEMENT OF COLUMBIA AND LOWER WILLAMETTE RIVERS BELOW PORTLAND, OREGON.

The location and plans of the work, with approved project of improvement and work done prior to the beginning of the present fiscal year, are all described in the summary of this report.

### APPROVED PROJECT.

The project of 1877, providing for a 20-foot channel, was extended in 1891 (Board of Engineers, October 14, 1891) to provide for a low-water channel of 25 feet from Portland to the sea, estimated cost $772,464, and the port of Portland, a corporation existing under the laws of the State of Oregon, was granted permission to assist in carrying it into execution.

A new project was submitted April 12, 1900, based on survey and report, authorized by act of March 3, 1899. This report is printed in House Ex. Doc. No. 673, Fifty-sixth Congress, first session, and also in Annual Report of the Chief of Engineers for 1900, page 4418 et seq. The revised estimate was $2,796,300, $175,000 for new dredge, and $50,000 for yearly maintenance.

### OPERATIONS DURING THE FISCAL YEAR 1901.

*Dredging.*—The only work of improvement carried on by the United States during the fiscal year was the deepening of the channel across a number of bars by the suction dredge *Wm. S. Ladd.* The localities, time, and results are shown in the following table:

*Table of dredging results.*

| Locality. | Periods at work. | Days working. | Hours pumping. | Material moved. | Minimum depth. | | Width of dredging. | Days repairing machinery. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Before. | After. | | |
| | | | | *Cu. yds.* | *Feet.* | *Feet.* | *Feet.* | |
| Pillar Rock Bar | July 23, 1900, to Sept. 1, 1900. | 29 | 124 | 68,489 | 18 | 22 | 350 | 1½ |
| Dobelbowers Bar | Sept. 1 to Nov. 1 and Nov. 5 to Nov. 12. | 45 | 213 | 107,318 | 18 | 23 | 400 | 5½ |
| Slaughters Bar | Nov. 1 to Nov. 4 and Nov. 18 to Jan. 1. | 35 | 184 | 72,923 | 20 | 22 | 250 | 4 |
| Tongue Point Crossing | Jan. 1, 1901, to Apr. 22, 1901. | 81 | 411 | 114,694 | 16 | 20 | 300 | 6½ |
| Harrington Point, near Post Light No. 4. | Apr. 22, 1901, to June 15, 1901. | 45 | 245 | 92,877 | 18 | 19½ | 225 | ½ |
| Harrington Point, near Post Light No. 2. | June 15, 1901, to June 30, 1901. | 12 | 66 | 27,005 | 18 | 19 | 200 | ........ |
| Total | ........ | 247 | 1,243 | 483,306 | ........ | ........ | ........ | 18½ |

### COST OF DREDGING.

[July 1, 1900, to June 30, 1901.]

| | | |
|---|---|---|
| Amount of material removed ........cubic yards.. | | 483,306 |
| Operating expenses, wages, subsistence, and current repairs........ | | $18,316.45 |
| Coal, 19.589 tons, Franklin, at $4.90 ........ | $95.99 | |
| 37.763 tons, Willis steam, at $4.75 ........ | 179.38 | |
| 950.918 tons, Roslyn, at $4.75 ........ | 4,516.86 | |
| 642.098 tons, Roslyn, at $5.25 ........ | 3,371.01 | |
| 1,650.368 | | 8,163.24 |
| Total cost of operating ........ | | 26,479.69 |

| | |
|---|---|
| Cost per cubic yard for the year ........cents.. | 5.479 |
| Cost per cubic yard for coal ........do.... | 1.689 |
| Coal consumed per cubic yard ........pounds.. | 7.649 |
| Yards dredged per ton of coal ........ | 292 |
| Cubic yards per day's dredging ........ | 1,957 |

The following is a statement of the total amount of material removed by the dredge since her construction in 1893:

| | Cubic yards. |
|---|---|
| Total to close of fiscal year 1900 ........ | 2,838,360 |
| 1900–1901 from Columbia River ........ | 483,306 |
| Grand total ........ | 3,321,666 |

### WORK OF THE PORT OF PORTLAND COMMISSION.

The Port of Portland Commission has operated its 20-inch Bowers dredge at different points in the Willamette and Columbia rivers, and reports excavation as follows:

| | Cubic yards. |
|---|---|
| Post-Office Bar | 185,199 |
| Mouth of Willamette | 183,460 |
| Reeders | 122,330 |
| Martins Island, upper end | 224,890 |
| Martins Island, lower end | 226,665 |
| Willow Bar | 10,713 |
| Hunters | 179,268 |
| Portland Harbor | 28,636 |
| Slaughters | 208,067 |
| Eagle Cliff | 58,039 |
| Knapps | 417,400 |
| Swan Island | 25,000 |
| Total | 1,869,667 |

The amount reported expended by the Commission during the year, for all purposes, is $55,065.70.

*Snagging.*—The snag boat *Mathloma* was engaged from October 1 to October 20, 1900, in pulling snags in the Columbia and Lower Willamette rivers, and removed 41 snags. During that period a snag went through her hull and she had to be beached for several days at Rainier. The tugs *Mendell* and *Lincoln* were also engaged at different periods in destroying snags and removed 17 at different points.

*Surveys.*—Ten new triangulation stations were established on high ground back of the old stations in the Willamette and Columbia rivers, between Portland and Goble. These were connected with the old stations and their coordinates computed. Thirty concrete monuments were built at triangulation stations in the Willamette River below Portland, and 33 in the Columbia River between the mouth of the Willamette and Goble. Sixty-eight triangulation stations in the Columbia River below Goble were marked with gas pipe driven into the ground.

*Miscellaneous.*—Supervision was kept over the laying of a gas-pipe main under the Willamette River at Portland, also over the dredging operations of the Port of Portland Commission.

One hundred and thirty-two applications for permission to erect fish traps and other structures in the Columbia River were received and acted upon.

*General remarks.*—The general condition of the channel from Portland to Fort Stevens remained relatively good throughout the year. The increased depth obtained by dredging at Tongue Point Crossing, allowing ships to cross at a lower stage of tide than formerly, brought to light the existence of what appears to be rock opposite Booth's Cannery, Astoria, at a depth of 19 feet at low water.

The river in the neighborhood of this crossing is in especial need of radical improvement.

The past season has been very favorable for navigation, but should low water exist the present dredge, even with the assistance afforded by the dredge of the Port of Portland Commission, will not be able to maintain sufficient depth to accommodate the increasing commerce. The need of a new dredge is therefore very apparent, and the cost of its construction has been included in the estimate for obtaining a 25-

foot channel from Portland to the sea. The estimated cost of a suitable dredge was given in the report as $175,000, with $50,000 for yearly maintenance. These amounts, together with $500,000 that can be profitably expended during the fiscal year 1903 for works of improvement, have been included in the appended money statement in accordance with letter from the Chief of Engineers, U. S. Army, dated May 24, 1900.

The available balance is to be applied to dredging for maintenance, and future appropriations as above outlined.

It is fully believed that the commerce would justify further work of obtaining greater depths with a view to avoiding delays to present commerce and the accommodation of ships of greater draft and capacity, which are already seeking this port. If undertaken sufficient funds should be appropriated to allow of good progress.

This work has been in the very efficient charge of Gerald Bagnall, assistant engineer.

*Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | $114,414.98 |
| Refunded account difference sheet, No. 42 | | 1.56 |
| | | 114,416.54 |
| June 30, 1901, amount expended during fiscal year | | 39,862.73 |
| July 1, 1901, balance unexpended | | 74,553.81 |
| July 1, 1901, outstanding liabilities | | 1,763.74 |
| July 1, 1901, balance available | | 72,790.07 |
| Amount (estimated) required for completion of existing project | | 2,898,509.93 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901: | | |
| For works of improvement | $675,000.00 | |
| For maintenance of improvement | 50,000.00 | |
| | | 725,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | | |

APPROPRIATIONS.

| | | |
|---|---|---|
| Lower Willamette, act of— | | |
| June 23, 1866 | $15,000 | |
| March 2, 1867 | 30,000 | |
| July 25, 1868 (allotted) | 21,000 | |
| April 10, 1869 (allotted) | 13,365 | |
| July 11, 1870 | 31,000 | |
| June 10, 1872 | 50,000 | |
| | | $160,365.00 |
| Lower Willamette, from Portland to the sea, act of— | | |
| March 3, 1873 | 20,000 | |
| June 23, 1874 | 20,000 | |
| March 3, 1875 | 20,000 | |
| August 14, 1876 | 20,000 | |
| June 18, 1878 | 30,000 | |
| March 3, 1879 | 45,000 | |
| | | 155,000.00 |
| Lower Willamette and Columbia, from Portland to the sea, including bar at the mouth of the Columbia, act of— | | |
| June 14, 1880 | 45,000 | |
| March 3, 1881 | 45,000 | |
| August 2, 1882 | 100,000 | |
| | | 190,000.00 |

| | | |
|---|---|---|
| Columbia and Lower Willamette, below Portland, Oreg., act of— | | |
| July 5, 1884 | $100,000 | |
| August 5, 1886 | 75,000 | |
| August 11, 1888 | 100,000 | |
| September 19, 1890 | 100,000 | |
| July 13, 1892 | 150,000 | |
| August 18, 1894 | 50,000 | |
| June 3, 1896 | 100,000 | |
| March 3, 1899 | 150,000 | |
| | | $825,000.00 |
| June, 1899, deposited to credit of appropriation | | .20 |
| May, 1901, deposited to credit of appropriation | | 1.56 |
| Total | | 1,330,366.76 |

### COMMERCIAL STATISTICS.

This work is in the collection district of Willamette and Oregon. The ports of entry are Astoria and Portland, Oreg. The nearest light-house is at the mouth of the Columbia River.

*Arrivals and clearances of vessels at Astoria, Oreg., during the year ending December 31, 1900.*

[From collector of customs at Astoria.]

| Vessels. | Coastwise. | | Foreign ports. | | Total. | |
|---|---|---|---|---|---|---|
| | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. |
| Arrived | 353 | 350,370 | 134 | 231,867 | 487 | 582,237 |
| Cleared | 321 | 352,588 | 150 | 264,284 | 471 | 616,872 |
| Total | 674 | 702,958 | 284 | 496,151 | 958 | 1,199,109 |

*Commerce for the year ending December 31, 1900.*

| | |
|---|---|
| Value of exports | $115,132.00 |
| Value of imports | 9,553.00 |
| Duties collected | 4,345.38 |

Principal items of export are lumber, salmon, flour, wheat, machinery, canned and dried fruit.

Principal items of import are coal, salt, cement, rice, Chinese wines and vegetables, etc.

*Arrivals and clearances of vessels at Portland, Oreg., during the year ending December 31, 1900.*

[From collector of customs at Portland.]

| Vessels. | Coastwise. | | Foreign ports. | | Total. | |
|---|---|---|---|---|---|---|
| | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. |
| Arrived | 253 | 361,728 | 27 | 48,378 | 280 | 410,106 |
| Cleared | 151 | 156,239 | 126 | 219,024 | 277 | 375,263 |
| Total | 404 | 517,967 | 153 | 267,402 | 557 | 785,369 |

*Commerce for the year ending December 31, 1900.*

| | |
|---|---|
| Value of exports to foreign countries | $9,005,368.00 |
| Value of imports from foreign countries | 1,510,075.00 |
| Duties collected | 529,549.45 |

The following statement of traffic on the Columbia and Lower Willamette rivers has been compiled from reports of the various steamers and transportation companies doing business on these rivers during the calendar year 1900. It includes freight carried in coasting vessels to and from Portland, but not that transported in deep-sea sailing vessels:

| Articles. | Tons. | Articles. | Tons. |
|---|---|---|---|
| Wheat | 20,735 | Wool | 1,084 |
| Other cereals | 5,473 | General merchandise | 205,411 |
| Flour | 33,085 | Fish | 11,788 |
| Piles (1,667,610 linear feet) | 24,870 | Sand and gravel | 108,502 |
| Lumber (29,378,721 feet B. M.) | 38,192 | Stone | 158,754 |
| Logs (237,695,412 feet B. M.) | 594,239 | Wood (35,479 cords) | 58,245 |
| Shingles | 1,993 | Hay | 5,194 |
| Cattle and horses (No. 13,236) | 5,295 | Hops | 310 |
| Sheep and hogs (No. 23,613) | 1,770 | | |
| Potatoes | 16,650 | Total | 1,287,582 |
| Coal | 992 | | |

Passengers carried, 252,351.

*Statement showing principal articles and tonnage of foreign exports and imports at Portland, Oreg., during the calendar year 1900.*

| Exported. | | Imported. | |
|---|---|---|---|
| Articles. | Tons. | Articles. | Tons. |
| Wheat | 316,121 | Raw and waste silk | 2 |
| Flour | 85,109 | Coal | 6,096 |
| Barley | 14,987 | Hemp (manila) and jute | 1,104 |
| Timber | 59,307 | Sulphur | 3,096 |
| Canned salmon | 21 | Earthenware | 77 |
| Cotton | 449 | Rice | 2,402 |
| Liquor | 400 | Sugar | 363 |
| Paper | 1,417 | Tea | 614 |
| | | Wool | 57 |
| Total | 477,811 | Salt | 690 |
| | | Cement | 17,517 |
| | | Window glass | 625 |
| | | Pig and bar iron | 120 |
| | | Spirits and malt liquors | 45 |
| | | Coffee | 97 |
| | | Total | 32,905 |

*Comparative statement of shipments of wheat and flour from Portland for the past eleven years.*

| Year ending— | Coastwise. | | | Foreign. | | | Total coastwise and foreign. |
|---|---|---|---|---|---|---|---|
| | Wheat. | Flour. | Total. | Wheat. | Flour. | Total. | |
| July 31— | *Tons.* | *Tons.* | *Tons.* | *Tons.* | *Tons.* | *Tons.* | *Tons.* |
| 1890 | | | | 104,828 | 52,343 | 157,171 | |
| 1891 | | | | 207,561 | 63,889 | 271,450 | |
| 1892 | | | | 227,406 | 52,907 | 280,313 | |
| 1893 | | | | 190,907 | 57,906 | 248,813 | |
| December 31— | | | | | | | |
| 1893 | | | | 207,327 | 56,202 | 263,529 | |
| 1894 | | | | 244,405 | 45,454 | 289,859 | |
| 1895 | | | | 275,573 | 65,399 | 341,972 | |
| 1896 | | | | 243,248 | 77,822 | 321,070 | |
| 1897 | 42,109 | 22,109 | 64,218 | 226,943 | 43,683 | 270,626 | 334,844 |
| 1898 | 43,534 | 15,088 | 58,622 | 384,771 | 80,422 | 465,193 | 543,815 |
| 1899 | 12,212 | 13,577 | 25,789 | 234,433 | 65,579 | 300,012 | 325,801 |
| 1900 | 5,914 | 5,660 | 11,574 | 316,121 | 85,109 | 401,230 | 412,804 |

*Statement of entrances and clearances at Portland custom-house of deep-sea vessels using Columbia and Lower Willamette rivers.*

| Year. | Inward. | | | | | |
|---|---|---|---|---|---|---|
| | Foreign. | | Coastwise. | | Total. | |
| | Number. | Registered tonnage. | Number. | Registered tonnage. | Number. | Registered tonnage. |
| Fiscal: | | | | | | |
| 1890 | 54 | 54,462 | 218 | 243,295 | 272 | 297,757 |
| 1891 | 83 | 101,488 | 193 | 235,133 | 276 | 336,621 |
| 1892 | 106 | 134,235 | 183 | 228,444 | 289 | 362,679 |
| Calendar: | | | | | | |
| 1893 | 86 | 98,650 | 158 | 183,170 | 244 | 281,820 |
| 1894 | 100 | 144,811 | 170 | 206,005 | 270 | 350,816 |
| 1895 | 117 | 165,554 | 132 | 159,522 | 249 | 325,076 |
| 1896 | 27 | 41,152 | 254 | 283,168 | 281 | 324,320 |
| 1897 | 27 | 42,384 | 220 | 288,079 | 247 | 330,463 |
| 1898 | 24 | 41,851 | 307 | 435,475 | 331 | 477,326 |
| 1899 | 27 | 44,287 | 231 | 338,686 | 258 | 382,973 |
| 1900 | 27 | 48,378 | 253 | 361,728 | 280 | 410,106 |

| Year. | Outward. | | | | | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Foreign. | | Coastwise. | | Total. | | | |
| | Number. | Registered tonnage. | Number. | Registered tonnage. | Number. | Registered tonnage. | Number. | Registered tonnage. |
| Fiscal: | | | | | | | | |
| 1890 | 98 | 96,403 | 192 | 212,123 | 290 | 308,524 | 562 | 606,281 |
| 1891 | 119 | 133,620 | 161 | 201,509 | 280 | 335,128 | 556 | 671,749 |
| 1892 | 141 | 162,526 | 137 | 183,504 | 278 | 346,030 | 567 | 708,709 |
| Calendar: | | | | | | | | |
| 1893 | 105 | 132,596 | 130 | 154,454 | 235 | 287,050 | 479 | 568,870 |
| 1894 | 100 | 138,840 | 144 | 159,227 | 244 | 298,067 | 514 | 648,883 |
| 1895 | 128 | 184,287 | 135 | 149,957 | 263 | 334,244 | 512 | 659,320 |
| 1896 | 97 | 212,873 | 182 | 159,605 | 279 | 372,478 | 560 | 696,798 |
| 1897 | 96 | 156,184 | 153 | 172,965 | 249 | 329,099 | 496 | 659,562 |
| 1898 | 158 | 264,663 | 184 | 217,268 | 342 | 481,931 | 673 | 959,257 |
| 1899 | 123 | 193,336 | 163 | 187,277 | 286 | 380,613 | 544 | 763,586 |
| 1900 | 126 | 219,024 | 151 | 156,239 | 277 | 375,263 | 557 | 785,369 |

*Value of imports and exports through Portland custom-house.*

| Year. | Imports. | Exports. | Total. |
|---|---|---|---|
| Fiscal: | | | |
| 1890 | $873,858.00 | $3,374,129.00 | $4,247,987.00 |
| 1891 | 1,214,515.33 | 5,254,097.00 | 6,468,612.33 |
| 1892 | 2,207,365.00 | 6,646,642.00 | 8,854,007.00 |
| Calendar: | | | |
| 1893 | 969,165.00 | 4,669,618.00 | 5,638,783.00 |
| 1894 | 760,303.00 | 3,841,316.00 | 4,601,619.00 |
| 1895 | 828,842.00 | 5,339,149.71 | 6,167,491.71 |
| 1896 | 1,111,715.00 | 7,235,109.00 | 8,346,824.00 |
| 1897 | 1,469,531.00 | 7,202,223.00 | 8,671,754.00 |
| 1898 | 1,538,887.00 | 12,796,668.00 | 14,335,555.00 |
| 1899 | 1,617,162.00 | 7,269,760.00 | 8,886,922.00 |
| 1900 | 1,510,075.00 | 9,005,368.00 | 10,515,443.00 |
| **Total** | 14,100,918.33 | 72,634,079.71 | 86,734,998.04 |

*Registered tonnage over Columbia River Bar.*

### INWARD TO ASTORIA AND PORTLAND.

| Year. | Deep-sea sailing vessels. | | | | | | Coasters. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | American. | | British. | | Other flags. | | | | | |
| | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. | Number. | Tonnage. |
| 1891 | 7 | 9,954 | 95 | 124,837 | 7 | 7,826 | 393 | 332,374 | 502 | 474,991 |
| 1892 | 15 | 21,834 | 84 | 114,485 | 6 | 7,699 | 344 | 252,170 | 449 | 393,188 |
| 1893 | 19 | 20,585 | 62 | 94,108 | 8 | 3,528 | 251 | 188,107 | 335 | 306,328 |
| 1894 | 22 | 17,239 | 69 | 114,102 | 9 | 14,470 | 190 | 206,005 | 290 | 350,816 |
| 1895 | 31 | 22,673 | 122 | 201,042 | 20 | 30,115 | 589 | 473,433 | 762 | 727,263 |
| 1896 | 12 | 8,816 | 107 | 165,850 | 8 | 10,850 | 512 | 346,302 | 639 | 531,638 |
| 1897 | 13 | 11,093 | 84 | 146,453 | 17 | 28,033 | 473 | 357,567 | 587 | 543,145 |
| 1898 | 26 | 23,592 | 86 | 156,481 | 30 | 47,333 | 510 | 480,760 | 652 | 708,166 |
| 1899 | 7 | 6,496 | 100 | 182,830 | 23 | 40,729 | 367 | 312,216 | 497 | 542,271 |
| 1900 | 8 | 5,830 | 101 | 191,078 | 49 | 89,332 | 320 | 290,188 | 478 | 576,428 |

### OUTWARD FROM PORTLAND AND ASTORIA.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1891 | 7 | 10,849 | 73 | 94,490 | 6 | 6,619 | 381 | 331,963 | 467 | 443,921 |
| 1892 | 12 | 18,165 | 99 | 130,405 | 6 | 7,332 | 351 | 252,734 | 468 | 408,636 |
| 1893 | 17 | 23,046 | 64 | 96,658 | 5 | 6,397 | 225 | 182,076 | 311 | 308,177 |
| 1894 | 25 | 19,244 | 68 | 109,893 | 9 | 9,703 | 144 | 159,227 | 246 | 298,067 |
| 1895 | 31 | 22,246 | 122 | 209,973 | 14 | 22,776 | 546 | 478,037 | 713 | 733,062 |
| 1896 | 20 | 13,863 | 103 | 154,419 | 12 | 16,116 | 484 | 340,446 | 619 | 524,844 |
| 1897 | 12 | 8,829 | 86 | 149,189 | 14 | 23,214 | 410 | 324,601 | 522 | 515,831 |
| 1898 | 22 | 20,415 | 128 | 229,454 | 32 | 51,008 | 458 | 465,816 | 640 | 766,693 |
| 1899 | 18 | 15,756 | 85 | 167,174 | 24 | 40,647 | 323 | 310,228 | 450 | 583,805 |
| 1900 | 7 | 4,738 | 91 | 174,235 | 49 | 86,195 | 300 | 303,317 | 447 | 568,485 |

A new transportation line, known as the Portland and Asiatic Steamship Company, has been established between this port and Asiatic points. The company operates three ships on this line, of 2,620, 3,152, and 3,152 tons register, respectively. Under the advertised schedule one steamer leaves Portland every thirty days.

The following transports cleared from Portland, Oreg., for the Philippines during the fiscal year ending June 30, 1901:

| Vessel. | Sailed. | Tonnage. | Cargo. |
|---|---|---|---|
| Lennox | July 6, 1900 | 2,361 | Government stores. |
| Argyll | Aug. 31, 1900 | 2,174 | Do. |
| Lennox | Sept. 25, 1900 | 2,361 | Horses, etc. |
| Thyra | Sept. 27, 1900 | 2,419 | Government stores. |
| Braemar | Oct. 6, 1900 | 2,315 | Do. |
| Buckingham | Nov. 10, 1900 | 1,876 | Do. |
| Thyra | Dec. 29, 1900 | 2,419 | Do. |
| Saint Bede | Jan. 4, 1901 | 2,287 | Do. |
| Kintuck | Mar. 20, 1901 | 2,880 | Animals, etc. |
| Oopack | May 18, 1901 | 2,517 | Oats, etc. |

*List of steamers plying on the Upper Willamette, Lower Willamette, and Columbia rivers, Oregon and Washington, during the calendar year 1900.*

| Name of vessel. | Net tonnage. | Depth. | Name of vessel. | Net tonnage. | Depth. |
|---|---|---|---|---|---|
| | | *Ft. in.* | | | *Ft. in.* |
| Alarm | 16 | 5 0 | City of Salem | 423 | 4 6 |
| Albany | 401 | 4 5 | Clara | | |
| Altona | 189 | 5 2 | Columbia | 1,746 | 14 4 |
| America | 67 | | Colwell | 11 | 3 5 |
| Argonaut | 20 | 7 7 | Cygnet | | |
| Astorian | 234 | 7 5 | Dalles City | 296 | 7 0 |
| Bailey Gatzert | 444 | 8 0 | Dolphin | 60 | 8 7 |
| Bonita | 122 | | Doyle | | |
| C. B. Hanthorn | | | Eclipse | 25 | 5 6 |
| Callender | | | Edith | 37 | 9 3 |
| Canby | 49 | 5 4 | Edyth | | |
| Chester | 98 | 3 8 | Electric | 24 | 5 3 |
| City of Eugene | 214 | | El Hurd | 26 | 6 2 |

*List of steamers plying on the Upper Willamette, Lower Willamette, etc.*—Continued.

| Name of vessel. | Net tonnage. | Depth. | | Name of vessel. | Net tonnage. | Depth. | |
|---|---|---|---|---|---|---|---|
| | | *Ft.* | *In.* | | | *Ft.* | *In.* |
| Elmore | 467 | 4 | 5 | Niad | 8 | ........ | |
| Emma | ........ | ........ | | Northwest | 301 | 4 | 8 |
| Enterprise | 137 | 3 | 3 | No Wonder | 235 | 5 | 6 |
| Escort No. 2 | 72 | 13 | 0 | Nutan | ........ | ........ | |
| Eugene | 271 | 5 | 8 | Occident | ........ | 6 | 4 |
| Fannie | 276 | 6 | 6 | Ocklahama | 565 | 8 | 3 |
| Fearless | 8 | ........ | | O. K | 47 | 5 | 2 |
| G. M. Shaver | 276 | 2 | 4 | Olympian | 1,083 | 12 | 5 |
| G. M. Walker | 125 | 4 | 2 | Oregon | 21 | ........ | |
| Game Cock | 658 | 7 | 8 | Oswego | 21 | 6 | 4 |
| Gertie | ........ | ........ | | Petrel | 8 | ........ | |
| Gold Gatherer | 40 | 3 | 0 | Peril | 8 | ........ | |
| Gov. Newell | 134 | 1 | 6 | Pamona | 295 | ........ | |
| Grey Eagle | 162 | 4 | 7 | Regulator | 334 | 6 | 5 |
| Gypsy | 154 | 3 | 6 | Reliance | 104 | ........ | |
| Harvest Queen | 697 | 7 | 5 | Republic | 60 | ........ | |
| Hassalo | 350 | 6 | 0 | R. Miler | 56 | 6 | 8 |
| Hattie | 6 | 3 | 5 | R. R. Thompson | 912 | 9 | 6 |
| Hazel | 35 | 6 | 9 | Resolute | 12 | ........ | |
| Hercules | 293 | ........ | | Ruth | 388 | 4 | 6 |
| Hoo-Hoo | 16 | 3 | 2 | Salem | 240 | 4 | 4 |
| Hustler | 129 | 7 | 0 | Samson | 189 | ........ | |
| Ione | 213 | 5 | 0 | Sarah Dixon | 278 | 6 | 5 |
| Iralda | 36 | 6 | 6 | State of California | 1,260 | 24 | 4 |
| Irene | ........ | ........ | | Sue H. Elmore | ........ | ........ | |
| James B. Stephens | 26 | 3 | 0 | Tacoma | 1,311 | 11 | 7 |
| Joseph Kellog | 272 | 3 | 4 | Tahoma | ........ | ........ | |
| Katie Weir | 5 | ........ | | T. J. Potter | 589 | 10 | 6 |
| Lora | 17 | 3 | 5 | Undine | 280 | 6 | 6 |
| Lurline | 338 | 6 | 6 | Vancouver | 157 | 7 | 0 |
| Maria | 184 | 5 | 9 | Vanguard | ........ | ........ | |
| Marion | ........ | ........ | | Volga | 48 | 4 | 0 |
| Mascot | 199 | 5 | 0 | Vulcan | 219 | 7 | 0 |
| May | 6 | 3 | 5 | Wallula | ........ | ........ | |
| McMinnville | 102 | ........ | | Wenona | 84 | 6 | 2 |
| Modoc | 337 | 4 | 4 | Wide Awake | 21 | ........ | |
| Mohawk | 20 | 4 | 4 | W. H. Harrison | 52 | 6 | 8 |
| Nahcotta | ........ | ........ | | Wm. M. Hoag | 431 | 5 | 6 |
| Nellie | 59 | ........ | | W. S. Mason | ........ | ........ | |
| Nellie | 7 | 4 | 0 | Yukon | 17 | 3 | 0 |
| New Western Queen | 83 | 8 | 0 | | | | |

## W W 5.

### IMPROVEMENT OF COLUMBIA RIVER BELOW TONGUE POINT, OREGON.

The location and plans of the work, with approved project of improvement and work done prior to the beginning of the present fiscal year, are all described in the summary of this report.

*Approved project.*—The original and present project (See Annual Report of the Chief of Engineers for 1895, pp. 3605–3608 et seq.) was adopted 1896. The ship *Sylvia de Grasse* was wrecked on a rocky ledge about 1 mile below Tongue Point in 1849, as near as can be determined, and for the removal of the wreck and a portion of the ledge upon which it rests, and for supplemental dredging, the river and harbor act of June, 1896, authorized the expenditure of $50,000 of the balance then on hand to the credit of the mouth of the Columbia River improvement.

The estimated cost was $121,550, and the river and harbor act of March 3, 1899, appropriated $71,000 for completion of project.

### OPERATIONS DURING THE FISCAL YEAR 1901.

The work consists of the removal of a portion of the Sylvia de Grasse reef situated in the Columbia River on the Oregon side, opposite the upper portion of Astoria. It is composed of a soft sandstone partly covered with sand and loose rock and bowlders.

Proposals were received for doing the work and opened August 27, but the bids were considered excessive and all were rejected as recommended. A contract dated October 20, 1900, was made under paragraph 519 of Army Regulations, with Mr. E. T. Johnson, of Portland, Oreg., for excavating the rock at rate of $6 per cubic yard, and sand at 50 cents per cubic yard. The quantities to be excavated, and estimated from survey since the contract was made, are rock, 11,800 cubic yards, and sand, 4,300 cubic yards.

Immediately upon approval of the contract a force was put in the field to survey and cross-section the work. Permanent triangulation stations were established, the line of cut marked out by pile and steel-rail dolphins. The whole area was sounded to determine the nature of the material, the work was platted, and quantities figured.

Operations by the contractor were commenced on January 7, 1901, but owing to poor management, and after numerous mishaps to drilling apparatus and dredge, were suspended in February, practically nothing having been accomplished.

After the construction of a drilling scow, carrying two steam drills of modern pattern, drilling was again resumed on April 25. An additional dredge of larger capacity was added to the plant in June, since which time fairly good progress has been made. A total of 573 cubic yards of rock have been removed.

It is proposed to apply the available balance of funds to completion of contract, and subsequent dredging, if necessary.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $110,188.62 |
| June 30, 1901, amount expended during fiscal year | 9,206.36 |
| July 1, 1901, balance unexpended | 100,982.26 |
| July 1, 1901, outstanding liabilities | 2,553.90 |
| July 1, 1901, balance available | 98,428.36 |
| July 1, 1901, amount covered by uncompleted contracts | 63,744.90 |

APPROPRIATIONS.

| | |
|---|---|
| June 3, 1896, from unexpended balance to the credit of improving mouth of Columbia River, Oregon and Washington | $50,000 |
| Act of March 3, 1899 | 71,000 |
| Total | 121,000 |

CONTRACT IN FORCE.

The only contract in force is with E. T. Johnson, of Portland, Oreg., which provides for excavating 4,500 cubic yards of rock, more or less, at $6 per cubic yard, and 10,000 to 12,500 cubic yards of sand, at 50 cents per cubic yard. The contract was approved November 19, 1900. Work began on January 7, 1901, and it is provided that the whole work shall be completed within nine months from that date.

### COMMERCIAL STATISTICS.

The tonnage over these waters is shown in report for improving Columbia and Lower Willamette rivers, below Portland, Oreg., and includes nearly all wheat shipments, most of the lumber and produce, and a greater portion of all imports using the Columbia River.

## W W 6.

## IMPROVEMENT OF THE MOUTH OF COLUMBIA RIVER, OREGON AND WASHINGTON.

The location and plans of the work, with approved project of improvement and work done prior to the beginning of the present fiscal year, are all described in the summary of this report.

Prior to commencing the work of construction in 1885 there were from one to three channels across the bar at the mouth of Columbia River, and these channels varied both in location and in depth, the latter being usually from 19 to 21 feet, while the location shifted through nearly 180 degrees from Cape Disappointment to Point Adams.

The jetty, with its four groins, was completed in the fall of 1895, and at that time a depth of 31 feet had been obtained. This channel has deteriorated in depth from year to year, the survey of 1900 showing but 23 to 24 feet at mean lower low water.

The sundry civil act of June 6, 1900, appropriated $250,000 for repair of the jetty, including repairs to wharves, approaches, tramway, plant, quarters and buildings, and contingent expenses. The project for expenditure of these funds was submitted June 20, and approved under date of July 3, 1900.

### OPERATIONS DURING THE FISCAL YEAR 1901.

Upon notification of approval of project, work was at once commenced on repairs to the jetty tracks, and in anticipation of the passage of a river and harbor bill at the last session of Congress, these repairs were pushed with all possible speed, with the view of being able to take up the work of extending the jetty by July 1, 1901. Repairs to other tracks, plant, buildings, etc., were also carried forward as rapidly as possible until the failure of the river and harbor bill made such rapid progress unnecessary, and since that time the work has been prosecuted with a greatly reduced force and in the most economical manner.

Reference is respectfully invited to the report on the project for increasing channel depths at the mouth of the Columbia River, printed in House Doc. No. 94, Fifty-sixth Congress, first session, and also in Report of Chief of Engineers for 1900, Part VI, pages 4430, et seq., for a history of the work and full details, maps, and charts of the proposed extension of the jetty, with estimates of cost. In the project estimates were furnished for a low-tide, mid-tide, and high-tide jetty. Of these, the mid-tide jetty was adopted as fulfilling the requirements for increasing the channel depths, at an estimated cost, including contingencies, of $2,531,140.51.

*Jetty tramway.*—The principal and most important portion of the work done during the year was the repairs to the jetty tracks. The jetty trestle is a double-track tramway, built on the line of the jetty, over which the rock and other material used in construction are transported to place. Its elevation above low water is 28 feet. From the shore end of the jetty, station 25x00, to its outer end, station 250x00, the total length of the jetty tramway was 22,500 feet. The outer 3,600 feet of this track had been washed away by the action of the sea at different times since completion of the work in 1895. This portion has to be entirely rebuilt by the driving of a new tramway close to the enrockment of the jetty. Between stations 25x00 and 214x00, a distance of 18,700 feet, the jetty tramway was repaired for the entire distance by the complete renewal of all the caps, stringers, ties, and rails, 40-pound rails being used for all tracks. Five cross-over tracks and three turn-outs were put in on this stretch of the tramway for the expeditious handling of construction trains. Rails weighing 30 pounds to the yard were formerly used in the construction of the jetty, but they were found to be too light for the work, as they soon became greatly weakened by the corrosion of the salt air. About 75 per cent of the piles in the jetty tracks were in fair condition and were utilized in the repairs. The heads of nearly all the piles were more or less decayed, and to secure sound wood for the new track timbers, the general grade of the tracks was decreased by about 18 inches, by sawing off the tops of all the piles this amount below their former grade. Where the piles were decayed below the established new grade, they were sawed off as far down as necessary to obtain good bearing surface, and the bents built up with square timbers for posts, or new piles driven.

The standing part of the tramway, to station 214x00, having been repaired, the reconstruction of the washed-away portion was begun on June 1, and at the close of the fiscal year 1,196 feet, station 214x00 to station 225x96, had been rebuilt, leaving 2,404 feet still to be redriven to reach the original end, station 250x00. It is probable that some parts of the reconstructed tramway may be washed away by the winter storms, but nothing of a serious nature is anticipated. The season during which it is safe to keep the driver at the front and drive piles at the end of the tramway extends, as a rule, from April 15 to October 15. The redriving of the 3,600 feet of tramway will probably require about three and one-half to four months. To postpone this to the next spring would cause additional delay to the work and over one-half the working season would pass before the jetty extension could be proceeded with. For this reason, it is deemed expedient to proceed with the work now and risk losing a small portion of the work during the winter months.

*Shore tracks.*—The shore tracks of the jetty extend from the wharf approaches, station 2x00, to the shore end of the jetty, station 25x00, a distance of 2,300 feet. This is also a double-track railway and was originally a trestle. This was filled in for nearly the whole distance and relaid with new ties and rails, including the necessary switches, cross-overs, and turn-outs.

*Storage platforms.*—On each side of the track built to connect with the Astoria and Columbia River Railroad, platforms, having a total area of 25,200 square feet, were erected for storing the track materials, which are unloaded directly from the standard cars to the platforms.

No work has been done toward putting the wharves and approaches in repair, as this is being deferred until it is determined whether the jetty rock will be delivered by rail or water.

The rolling stock has been put in thorough repair; 40 geared dump cars were knocked down, 35 of which were rebuilt into stronger design for heavier service, and the remainder nearly completed. Two flat cars and 1 box car were also rebuilt and 22 rocker dump cars were wrecked. These latter are obsolete and not adapted to the work, and in rebuilding they will be changed to flat or dump cars. Four locomotives were repaired and put in first-class condition.

The tug *Mendell* was hauled out and hull and machinery completely overhauled, including recasting of propeller.

The jetty tramway pile driver was rebuilt and construction of an additional driver commenced.

A new lathe and compressor plant were added to the machine shop, the shop engine overhauled, and new boiler installed.

The compressor plant and air tools have rendered valuable aid in general repair work. All hoisting engines and miscellaneous tools have been overhauled and are in good condition. Buildings have been repaired and additions made to the machine and car shops.

At the close of the present working season the jetty tramway will have been repaired for its whole length (4½ miles) and will be in excellent shape to allow the jetty extension to be proceeded with. The tramway will then be exposed to the winter storms and natural decay until funds are appropriated for its extension and before any benefits are realized from the great expense of these repairs. The risk of heavy damage to the tramway, the commercial importance of the improvement, and the urgency of obtaining an increased depth across the bar would seem to demand that funds be made available as soon as possible and in sufficient amount to complete the jetty extension without any delay. The working season of each year is short, and the exposure and liability of damage or partial destruction of the work is great, and an appropriation allowing of the work to be begun not later than April 1 can not be too urgently recommended.

The balance on hand is to be applied to completion of repairs of the jetty, and the amount ($600,000) included in the money statement is for extending the jetty in accordance with report on new project.

*Reconnaissance for rock.*—A great deal of time was spent in making examinations for a suitable rock supply for the jetty extension. In all, 14 different localities were examined, and several of the places revisited. On the whole the results were disappointing. The best rock found was about 25 miles east of Fort Stevens, a short distance away from the Astoria and Columbia River Railroad. The rock is a good gray basalt, weighing about 170 pounds to the cubic foot. The indications are considered quite favorable, but to fully determine its fitness, it will be necessary to open up the face by blasting. The fact that the Engineer Department was in search of a suitable rock supply for the jetty became well known throughout this section of the country, and all locations for a possible quarry were examined, when made known to this office. As other localities are being reported for examination, such places will be visited and inspected.

*Survey.*—Owing to repairs to the tug *Geo. H. Mendell*, which were delayed much beyond the time expected, the annual survey of the entrance was not commenced until June 25. It was completed July 8, 1901, the most essential portion of the mouth of the river having been covered. As a rule, very few changes in the depth of water have taken place in the stretch of channel between Fort Stevens and the end of the jetty. A slight shoaling in the channel across the bar has occurred, a maximum depth of 23 feet only at the average of the lowest low water being found, through a narrow channel 1,500 feet wide. Through last year's channel 24 feet could be carried over a width of 1,500 feet.

Peacock spit shows a considerable movement due west with a decided shoaling on its extension. On the channel side of the jetty and near its outer end Clatsop spit has built up more and moved farther into the channel than at any previous time. As a consequence, the harbor throat was much reduced in width, but shows an increased depth of from 10 to 12 feet. Around the end of the jetty and in its prolongation for some distance, greater depths are noticed than last year.

A tracing[1] showing the soundings taken is transmitted with this report.

This work has been in the very efficient charge of G. B. Hegardt, assistant engineer.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $256,926.86 |
| Refunded account difference sheet No. 21 | 2.00 |
| | 256,928.86 |
| June 30, 1901, amount expended during fiscal year | 160,745.62 |
| July 1, 1901, balance unexpended | 96,183.24 |
| July 1, 1901, outstanding liabilities | 5,670.90 |
| July 1, 1901, balance available | 90,512.34 |
| Amount (estimated) required for completion of existing project | 2,276,181.46 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 600,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

APPROPRIATIONS.

| Act of— | |
|---|---|
| July 5, 1884 | $100,000 |
| August 5, 1886 | 187,500 |
| August 11, 1888 | 500,000 |
| February 22, 1890 | 75,000 |
| September 19, 1890 | 475,000 |
| July 13, 1892 | 350,000 |
| August 18, 1894 | 338,180 |
| | 2,025,680 |
| Act of June 3, 1896, transferred to credit of improvement of Columbia River below Tongue Point | 50,000 |
| | 1,975,680 |
| Sundry civil act of June 6, 1900 | 250,000 |
| November, 1900, deposited to credit of appropriation | 2 |
| Total | 2,225,682 |

COMMERCIAL STATISTICS.

For commercial statistics see report on improving Columbia and Lower Willamette rivers below Portland, Oreg.

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[1] Not printed.

## W W 7.

### IMPROVEMENT OF CLATSKANIE RIVER, OREGON.

The location and plans of the work, with approved project of improvement and work done prior to the beginning of the present fiscal year, are all described in the summary of this report.

*Approved project.*—The project adopted in 1898 (see Annual Report of the Chief of Engineers for 1899, p. 3050) was approved by the Secretary of War on May 27, 1898, and the river and harbor act of March 3, 1899, appropriated $13,000 for completing the work. It provides for cutting a short channel across a bend immediately below Manzanillo, and another from the bend above this point to the first bend below the town of Clatskanie and for dredging immediately below the latter point, the work to be done by contract after due advertisement.

### OPERATIONS DURING THE FISCAL YEAR 1901.

No work has been done during the fiscal year on account of the long delay in perfection of title to the required land and right of way. This has finally been accomplished and deeds secured and approved by the Department of Justice, and the land purchased. Specifications for doing the work had been previously approved and the work was duly advertised, which resulted in a contract being drawn with Robert Wakefield, of Portland, Oreg., under date of June 28, 1901. This contract was authorized, but is not yet approved, and provides for dredging 56,000 cubic yards of material, more or less, at 14 cents per cubic yard, work to begin within thirty days of notification that contract is approved, and completed within five months from date of commencement.

So much of the available balance as is required will be applied to completion of above-mentioned contract. The work will probably be completed within the specified time as the season is favorable for its prosecution.

The channel has probably not deteriorated in depth since the last survey was made, but with the dredging completed, it is estimated that $1,500 will be required thereafter for annual maintenance in snagging and probable redredging.

The 3 miles of river under improvement is subject to tidal flow, and dredging is deemed the most expedient for economical improvement. In separate report, an estimate is given for construction of dredging plant for use on this and other tributaries of the Columbia, and, if the funds are made available, and the dredge built, it is estimated that sufficient funds for its operation will remain after the above-mentioned dredging contract is completed. For this reason no estimate is named in the money statement for maintenance during fiscal year 1902.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $12,865.89 |
| June 30, 1901, amount expended during fiscal year | 277.42 |
| July 1, 1901, balance unexpended | 12,588.47 |

APPROPRIATION.

| | |
|---|---|
| Act of March 3, 1899 | $13,000 |

### COMMERCIAL STATISTICS.

The Shaver Transportation Company, of Portland, Oreg., operate three steamers between Portland and points on this river. They are the *G. W. Shaver*, 276 tons register; *Sarah Dixon*, 278 tons register, and the *No Wonder*, 269 tons register.

Considerable quantities of timber products are also annually towed out of the stream by boats plying on the Columbia River.

The following statement of traffic on the Clatskanie River has been compiled from reports of the various steamers and transportation companies doing business on this river during the year ending December 31, 1900:

| | Tons. | | Tons. |
|---|---|---|---|
| Wheat | 65 | Sheep and hogs | 17 |
| Other cereals | 635 | Coal | 11 |
| Flour | 545 | Wool | 4 |
| Lumber (1,630,400 feet B. M.) | 21,119 | Merchandise | 19,820 |
| Piles (15,000 linear feet) | 220 | Hay | 63 |
| Shingles | 825 | Potatoes | 210 |
| Logs (17,975,300 feet B. M.) | 44,988 | | |
| Cattle and horses | 70 | Total | 88,622 |
| Hops | 30 | | |

Passengers carried, 5,305.

## W W 8.

## IMPROVEMENT OF LEWIS RIVER, WASHINGTON.

The location and plans of the work with approved project of improvement and work done prior to the beginning of the present fiscal year are all described in the summary of the report.

*Approved project.*—The project adopted in 1897 (see Annual Report of the Chief of Engineers for 1897, p. 3475) contemplates obtaining a channel of 6 feet in the main river to the forks and a depth of 4 feet thence to Lacenter on the east fork, about 7 miles distant from the mouth, the improvement to consist of training and closing dikes and supplemental dredging.

The estimated cost of the improvement is $20,460, and the river and harbor act of March 3, 1899, appropriated $10,000 to be applied as above.

### OPERATIONS DURING THE FISCAL YEAR 1901.

The completion of the dike previously commenced at Cowley Bar was the only work done during the fiscal year. This dike was extended to a total length of 455 feet during July and August, and has produced beneficial results in maintaining depths. At the forks below Cowley bar, where dredging was done in fiscal year 1900, the channel has been sufficient to allow boats to pass at all stages. To determine the definite results accomplished, and for laying out future operations, it is probable that a survey will be necessary.

The available balance and amount required for project is to be applied to snagging and construction and repair of dams, with probable supplemental dredging. Aside from the snagging annually required, no deterioration has taken place and it is estimated that $1,500 will be required annually to keep the river free of snags and logs, and this amount is named in the money statement for that purpose. Should funds be made available for construction of dredging plant (estimated for in separate report) for use on this and other tributaries of the Columbia, it is believed that the funds required for completion of the project will be ample to allow of its operation for such time as may be necessary during the fiscal year ending June 30, 1903.

*Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | $5,715.05 |
| June 30, 1901, amount expended during fiscal year | | 342.54 |
| July 1, 1901, balance unexpended | | 5,372.51 |
| Amount (estimated) required for completion of existing project | | 10,460.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901: | | |
| For works of improvement | $10,460.00 | |
| For maintenance of improvement | 1,500.00 | |
| | | 11,960.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | | |

APPROPRIATION.

| | |
|---|---|
| Act of March 3, 1899 | $10,000 |

COMMERCIAL STATISTICS.

The Vancouver Transportation Company, of Portland, Oreg., operate the steamer *Mascot*, 199 tons register, and the *G. M. Walker*, 125 tons register, between Portland and points on this river. Various Columbia River towboats also make frequent trips for the purpose of towing out lumber and logs.

The following statement of traffic on the Lewis River has been compiled from reports of the various steamers and transportation companies doing business on this river during the year ending December 31, 1900:

| | Tons. | | Tons. |
|---|---|---|---|
| Cereals | 1,097 | Merchandise | 3,407 |
| Lumber (8,198,000 feet B. M.) | 10,657 | Fish | 78 |
| Logs (2,500,000 feet B. M.) | 7,250 | Hay | 608 |
| Cattle and horses (number 768) | 307 | Potatoes | 2,204 |
| Sheep and hogs (number 711) | 53 | Wood (2,569 cords) | 4,853 |
| Coal | 14 | | |
| Wool | 17 | Total | 30,545 |

Passengers carried, 14,129.

## W W 9.

## IMPROVEMENT OF COWLITZ RIVER, WASHINGTON.

The location and plans of the work, with approved project of improvement and work done prior to the beginning of the present fiscal year, are all described in the summary of this report.

*Approved project.*—The original and present project was prepared in 1879 and adopted in 1880. It contemplated the removal of sand bars, snags, overhanging trees, and rocks to a point about 50 miles above the mouth. The original estimate was $5,000 for the first year and an expenditure thereafter of $2,000 per year for maintenance.

### OPERATIONS DURING THE FISCAL YEAR 1901.

No work has been done during the fiscal year, as the funds had previously been exhausted. The appropriation of $3,000 by act of March 3, 1899, was insufficient to do the necessary snagging and allow of the completion of the dam below Toledo, where a bar had been formed by the high water of 1897. The conditions, however, are greatly improved and boats are running to Toledo regularly, experiencing some difficulty in crossing this place. This bar, if conditions are unchanged when appropriation is made, should be overcome by proper dam construction with a view to securing a channel of 3 feet at low water, and some additional work will also be necessary at three or four crossings farther downstream.

It is proposed to apply any additional funds appropriated to snagging and the construction of such permanent work as may appear most necessary and to probable supplemental dredging. It is believed that dredging can be done to great advantage in some of the lower tidal reaches of this river where bars are formed by freshets which are not susceptible to great improvement by dam construction. In separate report an estimate is made for its construction to be used on this and other tributaries of the Columbia River as may be most necessary.

No deterioration has taken place, aside from logs and snags which are annually floated into the channel. For thoroughly snagging the stream it is estimated that $1,000 will be required, and for removal of obstructions that may be carried into the channel during the fiscal year 1903 an additional sum of $1,000 will be necessary. Included in the $5,000 required for works of improvement is a certain amount for dredging which will be applied to operation of dredging plant, above referred to, should funds be appropriated for its construction. To operate the dredge will cost about $1,500 per month, but as the amount of dredging required can not now be determined no definite amount of funds needed therefor can be given.

*Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | $16.50 |
| June 30, 1901, amount expended during fiscal year | | 12.60 |
| July 1, 1901, balance unexpended | | 3.90 |
| Amount (estimated) required for completion of existing project | | Indefinite. |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901: | | |
| For works of improvement and probable dredging | $5,000.00 | |
| For maintenance of improvement | 2,000.00 | |
| | | 7,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | | |

### APPROPRIATIONS.

| Act of— | |
|---|---|
| June 14, 1880 | $2,000 |
| March 3, 1881 | 1,000 |
| August 2, 1882 | 1,000 |
| July 5, 1884 | 2,000 |
| August 5, 1886 | 2,000 |
| August 11, 1888 | 3,000 |
| September 19, 1890 | 8,000 |
| July 13, 1892 | $3,000 |
| August 18, 1894 | 3,000 |
| June 3, 1896 | 3,000 |
| March 3, 1899 | 3,000 |
| Total | 31,000 |

### COMMERCIAL STATISTICS.

The Kellogg Transportation Company, of Portland, Oreg., operates a line of steamers between Portland and head of navigation on this stream. A list of its boats is as follows:

| Name of vessel. | Tons. | Draft. |
|---|---|---|
| | | *Ft. In.* |
| Joseph Kellogg | 272 | 2 2 |
| Northwest | 301 | 1 3 |
| Chester | 98 | 2 |

In addition to above, various Columbia River towboats make frequent trips over this stream for the purpose of towing out lumber and logs.

The following statement of traffic on the Cowlitz River has been compiled from report of the various steamers and transportation companies doing business on this river during the year ending December 31, 1900:

| | Tons. |
|---|---|
| Wheat | 580 |
| Lumber (1,270,000 feet B. M.) | 1,651 |
| Piles (100,000 linear feet) | 1,500 |
| Shingles | 129 |
| Logs (53,102,000 feet B. M.) | 132,755 |
| Cattle and horses (number, 2,020) | 808 |
| Sheep and hogs (number, 1,280) | 96 |
| Merchandise | 5,833 |
| Fish | 200 |
| Hay | 3,022 |
| Potatoes | 3,200 |
| Hops | 260 |
| Total | 150,034 |

Passengers carried, 13,000.

## W W 10.

### IMPROVING THE TRIBUTARIES OF THE COLUMBIA RIVER, OREGON AND WASHINGTON, BELOW THE MOUTH OF THE WILLAMETTE RIVER, BY THE CONSTRUCTION AND EQUIPMENT OF A DREDGING PLANT FOR USE THEREON.

Existing projects providing for the improvement of these streams, with status of improvement, will be found in summary of annual reports pertaining to each.

This new project is based on letter, with estimate, submitted by the district officer, dated May 16, 1901, recommended by the division engineer and concurred in by the Chief of Engineers under date of June 4, 1901.

The streams at present under improvement are the Lewis and Cowlitz rivers, Washington, and Clatskanie River, Oregon. They are of a tidal nature in their lower reaches, being practically tidal sloughs over the greater part of the portions under improvement. The annual freshets occurring during the rainy season carry a great amount of sediment, due to the steep slopes and swift current of the upper reaches. This sediment being brought down and deposited forms shoals and bars in the sluggish waters, which are not susceptible of great improvement by dike or dam construction. This is especially true of the Lewis and Clatskanie rivers, and it is believed that a dredge will prove a necessity to maintain depths, and that in continuation of improvement such a plant could be used to excellent advantage in creating the new channels desired, as well as in maintaining them afterwards.

It is estimated that a light-draft dipper or clam-shell dredge, together with a light-draft sternwheel tender and two scows, could be built and equipped with tools and appliances suitable for use on these streams for $40,000. There is no such plant available in this district, and the necessity for its use would seem to fully justify the expenditure.

To operate the dredge, including tender and all expenses, will probably cost $1,500 per month, such operating expenses to be paid each year from funds that may be made available from time to time for improvement or maintenance of the particular stream upon which the dredge is used. The plant to be constructed by contract in the usual manner.

Statistical information as to traffic over these streams will be found in the respective reports. The total on the three streams was, however, during the last calendar year 118,539 tons.

*Money statement.*

| | |
|---|---|
| Amount that can be profitably expended in fiscal year ending June 30, 1903 | $40,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

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## W W 11.

### GAUGING WATERS OF COLUMBIA RIVER, OREGON AND WASHINGTON.

The object of this gauging is to obtain data for use in connection with the improvement of the river, and to supply information to persons interested in its navigation.

#### OPERATIONS DURING THE FISCAL YEAR 1901.

The self-registering tide gauge which was reestablished at Astoria, Oreg., in November, 1888, was removed to Fort Stevens, Oreg., in August, 1899, where it could be more economically maintained. It has been kept in operation during the fiscal year, and, in view of its importance as a benefit to pilots and others interested in navigation, is considered a worthy object.

The amount expended on this work to June 30, 1900, was $7,196.63.

For this work it is estimated that $1,000 can be advantageously applied to running levels and establishing a system of gauges.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $803.37 |
| June 30, 1901, amount expended during fiscal year | 20.25 |
| July 1, 1901, balance unexpended | 783.12 |
| July 1, 1901, outstanding liabilities | 10.00 |
| July 1, 1901, balance available | 773.12 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 1,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | |

APPROPRIATIONS.

| Act of— | | Act of— | |
|---|---|---|---|
| August 2, 1882 | $500 | June 3, 1896 | $1,000 |
| July 5, 1884 | 1,000 | March 3, 1899 | 1,000 |
| August 5, 1886 | 1,000 | | |
| August 11, 1888 | 2,500 | Total | 8,000 |
| August 18, 1894 | 1,000 | | |

# APPENDIX X X.

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## IMPROVEMENT OF CERTAIN RIVERS AND HARBORS IN WASHINGTON, IDAHO, AND MONTANA.

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*REPORT OF MAJ. JOHN MILLIS, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901, WITH OTHER DOCUMENTS RELATING TO THE WORKS.*

### IMPROVEMENTS.

1. Willapa River and Harbor, Washington.
2. Grays Harbor and Bar entrance, Washington.
3. Chehalis River, Washington.
4. Puget Sound and its tributary waters, Washington.
5. Olympia Harbor, Washington.
6. Waterway connecting Puget Sound with Lakes Union and Washington.
7. Everett Harbor, Washington.
8. Swinomish Slough, Washington.
9. Okanogan River, Washington.
10. Pend Oreille River, Washington.
11. Kootenai River, Idaho, between Bonners Ferry and the international boundary line.
12. Flathead River, Montana.

### EXAMINATIONS AND SURVEY.

13. Tacoma Harbor, Washington.
14. Kootenai River, between Jennings, Montana, and the international boundary line.

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United States Engineer Office,
*Seattle, Wash., July 16, 1901.*

General: I have the honor to forward herewith annual reports of the river and harbor works in my charge for the fiscal year ending June 30, 1901.

Very respectfully, your obedient servant,

John Millis,
*Major, Corps of Engineers.*

Brig. Gen. Geo. L. Gillespie,
*Chief of Engineers, U. S. A.*

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## X X 1.

## IMPROVEMENT OF WILLAPA RIVER AND HARBOR, WASHINGTON.

During the month of September, 1900, the channel through the log jam in North River, which had previously been cleared for a width of 85 feet, was thoroughly cleared and widened to 100 feet. A recent examination of the Willapa River dikes showed that some repairs are now necessary. The work will be repaired with the balance available at an estimated cost of $500.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $5,122.04 |
| June 30, 1901, amount expended during fiscal year | 915.10 |
| July 1, 1901, balance unexpended | 4,206.94 |

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APPROPRIATIONS.

Act of—

| | |
|---|---|
| July 13, 1892 | $18,000 |
| August 18, 1894 | 13,350 |
| March 3, 1899 | 5,000 |
| Total | 36,350 |

---

COMMERCIAL STATISTICS.

Willapa Harbor is in the collection district of Puget Sound. The nearest lighthouse is on Toke Point, at the north side of the entrance (Willapa Bay light station).

*Shipping.*

| | Arrived, coastwise. | Departed, coastwise. | Arrived, foreign. | Departed, foreign. |
|---|---|---|---|---|
| Steam vessels | 17 | 17 | | |
| Sail vessels | 44 | 43 | 3 | 4 |

The maximum draft of above vessels was 18½ feet.

*Exports and imports.*

| | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons.* | | *Tons.* | |
| Lumber and products | 40,930 | $200,130.00 | | |
| Miscellaneous merchandise | 100 | 5,000.00 | 1,060 | $60,950.00 |
| Total | 41,030 | 205,130.00 | 1,060 | 60,950.00 |

Four thousand seven hundred and forty-three tons of miscellaneous freight, valued at $265,136, and 10,190 passengers were carried between local points on Willapa Harbor. Four small steamers of an approximate total gross tonnage of 150 tons and maximum draft of 7 feet were engaged in local traffic.

Forty million feet B. M. of saw logs were towed to the mills on the harbor.

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## X X 2.

## IMPROVEMENT OF GRAYS HARBOR AND BAR ENTRANCE, WASHINGTON.

Construction work continued from July 1 until November 16, when active operations were suspended for the winter. During the winter the wharf and portions of the plant were repaired. Work was resumed on April 11 and actively prosecuted during the remainder of the fiscal year.

During the year the following materials were received from the contractor:

| | |
|---|---|
| 105,565 linear feet piles, at 11 cents | $11,612.15 |
| 354,403 feet B. M. lumber, at $11 | 3,898.43 |
| 75.017 tons steel railroad rails, etc., at $40 | 3,000.68 |
| 56,595 pounds iron, at 4 cents | 2,263.80 |
| 13,885.91 cubic yards brush, at $1.20 | 16,663.09 |
| 184,240.2 tons stone, at $1.10 | 202,664.22 |
| Total | 240,102.37 |

The progress during the year and the status of the work at its close were as follows:

The jetty trestle was advanced 3,232 feet, the completed foundation advanced 3,200 feet, and the enrockment completed to the level of ordinary high water for an additional distance of 1,992 feet. At the end of June, 1901, the jetty trestle had been completed 10,968 feet outside the high-water line on the ocean side of the spit, the foundation had been completed 10,840 feet, and enrockment raised to or above the level of ordinary high water 9,192 feet from the shore line.

Upon resuming work in the spring, it was found that considerable scour had taken place near the end of the work of the previous season, and much greater depths were encountered than were indicated by the original survey. The maximum depth found in setting the piles of the trestle was 34 feet. After advancing the work about 400 feet a much less depth, approaching the normal, was found, but the length of jetty that can be built within the original estimate will be considerably less than was first estimated.

The point has been passed where it was originally intended to curve the jetty southward in order to follow the shoal water. The work has, however, been continued in a straight line as far as built, since the changes on the bar have been such as to render this course advantageous. Soundings on the bar and in the vicinity of the jetty were made in June. The least depth found in the best channel was 18 feet.

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $334,980.45 |
| Amount appropriated by sundry civil act approved March 3, 1901 | 138,225.00 |
| | 473,205.45 |
| June 30, 1901, amount expended during fiscal year | 207,055.37 |
| July 1, 1901, balance unexpended | 266,150.08 |
| July 1, 1901, outstanding liabilities | 4,628.17 |
| July 1, 1901, balance available | 261,521.91 |
| July 1, 1901, amount covered by uncompleted contracts | 256,246.64 |
| Amount (estimated) required for completion of existing project | 156,775.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 156,775.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

### APPROPRIATIONS.

| Act of— | |
|---|---|
| June 3, 1896 | $20,000 |
| June 4, 1897 | 350,000 |
| March 3, 1899 | 285,000 |
| June 6, 1900 | 50,000 |
| March 3, 1901 | 138,225 |
| Total | 843,225 |

### CONTRACT IN FORCE DURING FISCAL YEAR.

Contractors: The Hale & Kern Contract Company.
Date of contract: January 26, 1898.
Date of approval: February 23, 1898.
Date of commencement: May 1, 1898.
Date of completion: September 30, 1902.

### COMMERCIAL STATISTICS.

Grays Harbor is in the collection district of Puget Sound. Aberdeen is a subport of entry.

*Shipping.*

| | Arrivals, domestic. | Arrivals, foreign. | Departures, domestic. | Departures, foreign. |
|---|---|---|---|---|
| Steam vessels | 97 | | 95 | |
| Sail vessels | 195 | 18 | 176 | 44 |

Maximum draft of vessels 17 feet 10 inches.

*Exports and imports.*

| Articles. | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons* | | *Tons.* | |
| Brick | | | 100 | $4,000 |
| Hay | | | 200 | 2,400 |
| Lumber and products | 250,276 | $1,435,838 | | |
| Machinery, etc. | | | 700 | 82,000 |
| Miscellaneous merchandise | 1,798 | 59,249 | 6,618 | 493,550 |
| Total | 252,074 | 1,495,087 | 7,618 | 581,950 |

Twelve steamers and 4 launches were engaged in the local traffic; approximate total gross tonnage, 951 tons; maximum draft, 4½ feet.

Five steam and 7 sail vessels were constructed at yards on Grays Harbor Bay; total gross tonnage, 4,900 tons; 424 passengers were carried coastwise; 201,794.468 feet B. M. of logs were towed to the mills of the harbor.

## X X 3.

## IMPROVEMENT OF CHEHALIS RIVER, WASHINGTON.

No work was done on this river until about the middle of June, when a steamboat was hired and appliances put on board for the purpose of clearing certain obstructions below Montesano. Up to the close of the year 91 snags had been taken out.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $2,078.91 |
| June 30, 1901, amount expended during fiscal year | 490.50 |
| July 1, 1901, balance unexpended | 1,588.41 |
| Amount (estimated) required for completion of existing project | Indefinite. |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 3,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

---

APPROPRIATIONS.

| Act of— | | Act of— | |
|---|---|---|---|
| August 2, 1882 | $3,000 | June 3, 1896 | $3,000 |
| July 5, 1884 | 2,500 | March 3, 1899 | 3,000 |
| August 5, 1886 | 2,500 | | |
| August 11, 1888 | 2,000 | Total | 19,000 |
| September 19, 1890 | 3,000 | | |

---

COMMERCIAL STATISTICS.

The exports and imports are not given separately. The traffic consisted of lumber, general merchandise, and farm products.

Four thousand three hundred and seventy-six tons of freight, valued at $132,157, and 31,037 passengers were carried.

Two steamers, with an aggregate gross tonnage of 250 tons and maximum draft of 4½ feet, were engaged in the traffic.

---

## X X 4.

## IMPROVEMENT OF PUGET SOUND AND ITS TRIBUTARY WATERS, WASHINGTON.

The snag boat *Skagit* worked continuously throughout the year until May 5, when she was brought to Seattle for necessary repairs to her boiler. The boat was also hauled out, the hull repaired and calked, machinery repaired, and some repairs and alterations made to upper works. The streams worked on were the Skagit, Stillaguamish, and Snohomish rivers. The boat also made trips of inspection through Swinomish and Hat sloughs and to the mouth of the Nooksack River. This latter river has been entirely closed to navigation for some time by a log boom in Bellingham Bay near the mouth, and by an extensive log jam in the lower portion of the river. Action has been taken by the Department of Justice to compel the removal of these obstructions.

The total number of snags removed during the year was 4,235, and of overhanging trees on banks cut, 246. A small wreck was removed from the channel of the Snohomish River near Snohomish, and a small amount of earthwork was done to prevent a threatened change of channel on the Skagit near Mount Vernon. Neither excessive floods nor extreme low stages occurred during the year. In view of the increasing number of fish traps and log booms in Puget Sound and tributary waters, an estimate of $5,000 for maintenance is submitted.

*Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | $32,721.87 |
| June 30, 1901, amount expended during fiscal year | | 12,502.72 |
| July 1, 1901, balance unexpended | | 20,219.15 |
| July 1, 1901, outstanding liabilities | | 1,959.66 |
| July 1, 1901, balance available | | 18,259.49 |
| Amount (estimated) required for completion of existing project | | Indefinite. |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901: | | |
| For works of improvement | $25,000.00 | |
| For maintenance of improvement | 5,000.00 | |
| | | 30,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899. | | |

APPROPRIATIONS.

| Act of— | | Act of— | |
|---|---|---|---|
| June 14, 1880 | $2,500 | July 13, 1892 | $15,000 |
| August 2, 1882 | 20,000 | August 18, 1894 | 14,000 |
| July 5, 1884 | 10,000 | June 3, 1896 | 75,000 |
| August 5, 1886 | 10,000 | March 3, 1899 | 20,000 |
| August 11, 1888 | 15,000 | | |
| September 19, 1890 | 12,000 | Total | 193,500 |

COMMERCIAL STATISTICS.

*Exports and imports.*

| | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons.* | | *Tons.* | |
| Agricultural implements | | | 1,000 | $100,000 |
| Grain | 5,027 | $120,648 | | |
| Hay | 12,234 | 146,808 | | |
| Live stock | 50 | 2,500 | 40 | 2,000 |
| Miscellaneous merchandise | 5,380 | 102,780 | 11,335 | 850,190 |
| Total | 22,691 | 372,736 | 12,375 | 952,190 |

The above statistics are for the Skagit and Snohomish rivers.

Eight million feet B. M. of saw logs, 893,075 linear feet of piling, and 15,000 cords of shingle bolts were floated down the Skagit River.

Forty million feet B. M. of saw logs and 10,000 cords of shingle bolts were floated down the Snohomish River.

One steamer carried 35,369 passengers on the Snohomish River.

## X X 5.

## IMPROVEMENT OF HARBOR AT OLYMPIA, WASHINGTON.

No work was done and no funds expended except for inspection during the year, on account of the small balance available.

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $116.75 |
| June 30, 1901, amount expended during fiscal year | 10.50 |
| July 1, 1901, balance unexpended | 106.25 |
| Amount (estimated) required for completion of existing project | 25,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 25,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

---

#### APPROPRIATIONS.

Act of—

| | |
|---|---|
| July 13, 1892 | $35,000 |
| August 18, 1894 | 40,000 |
| June 3, 1896 | 32,000 |
| March 3, 1899 | 15,000 |
| Total | 122,000 |

---

#### COMMERCIAL STATISTICS.

Olympia is in the collection district of Puget Sound.

Three steamers, with an aggregate gross tonnage of 1,661 tons, were engaged in local traffic. Fifty-seven thousand five hundred and fifteen passengers were carried.

Seventeen sail vessels, with an aggregate gross tonnage of 5,004 tons, were engaged in coastwise traffic.

*Exports and imports.*

| Articles. | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons.* | | *Tons.* | |
| Beer | 1,538 | $115,350 | | |
| Flour and feed | 770 | 18,160 | | |
| Live stock | 134 | 10,720 | 64 | $5,120 |
| Lumber and products | 16,569 | 86,574 | | |
| Shell fish | 1,260 | 21,670 | | |
| Miscellaneous merchandise | 5,332 | 272,375 | 5,067 | 309,270 |
| Wood | 4,732 | 9,464 | | |
| Total | 30,335 | 534,313 | 5,131 | 314,390 |

## X X 6.

## IMPROVEMENT OF WATERWAY CONNECTING PUGET SOUND WITH LAKES UNION AND WASHINGTON.

The appropriations for this work have been made with the following proviso:

> No part of said amount shall be expended on the improvement of the waterway connecting the waters of Puget Sound with Lakes Union and Washington until the entire right of way and release from all liability to adjacent property owners have been secured to the United States free of cost and to the satisfaction of the Secretary of War.

To comply with the requirements of the above proviso King County, in which this canal is located, obtained the title to the entire right of way and secured the release from all liability to adjacent property owners by condemnation proceedings, and then deeded the same to the United States. The preliminary steps were all completed during the previous year, and the deed was received and filed for record June 22, 1900.

Borings along the line of the canal in Salmon Bay to determine the character of the material to be excavated and the nature of the foundation of the lower lock and dam were commenced with a hired floating plant in October, 1900, and completed in December. The total number of borings was 80, and the total depth of borings was 2,791 feet. No rock was encountered, the material found being all a glacial deposit of gravel, sand, clay, and hardpan. Specifications were prepared and bids invited for making a cut 50 feet wide on the bottom and to the full depth now contemplated along the axis of the canal from Puget Sound to the lower lock site, a distance of about 6,000 feet. The lowest bid received, that of the Puget Sound Bridge and Dredging Company, at 26.7 cents per cubic yard, was accepted and contract entered into. Work is to begin July 3. In January the systematic observations of water levels at various points were commenced. The gauges established and the dates records commenced were as follows:

| Gauges. | Record commenced. |
|---|---|
| Fremont Outlet | Jan. 5, 1901 |
| Head of Lake Union | Do. |
| University Waterworks | Do. |
| Head of Lake Washington | Do. |
| South end of Lake Washington | Do. |
| Lower Black River | Mar. 7, 1901 |
| Cedar River Bridge | Do. |
| Upper Black River | Mar. 20, 1901 |

It was desired to begin regular tidal observations in Salmon Bay as soon as the observations of lake levels began, but this was prevented by delay in procuring a self-registering tide gauge. The apparatus was finally installed on May 31, near the site of the lower lock, and the record has been continuous since that date. Apparatus for current observations and discharge measurements was procured from the east, a number of sections were established, and the first measurements of discharge were made on February 9, 1901.

The sections that have been established and the number of sets of measurements for discharge made at each are as follows:

| Sections. | Number of sets. | Sections. | Number of sets. |
|---|---|---|---|
| Lake Union Outlet | 12 | Cedar River | 18 |
| Portage Canal | 18 | Upper Black River | 15 |
| Lower Black River | 18 | | |

In order to prevent encroachments on Lake Union and the diminution of its reservoir capacity, the establishment of harbor lines in the lake was authorized by the Chief of Engineers on April 16, 1901. Surveys to determine the location of proposed harbor lines have been inaugurated.

Upon notice from this office the removal of buildings from the canal right of way between Lake Union and Salmon Bay began in May, and most of the buildings that were not abandoned by their owners were removed by the end of the year.

By letter of May 29, 1901, from the Chief of Engineers, the excavation of a narrow cut along the canal location between Salmon Bay and Lake Union was authorized. The cut is to have a depth not greater than 10 feet above the bottom of the canal, a bottom width of 10 feet, and side slopes of 1½ horizontal to 1 vertical. Its object is to place the control of the outlet from Lake Union in the hands of the Government—the present outlet being through a small creek flowing partly through private property—to determine the nature of the material to be excavated and the cost, and to hasten the adjustment of questions of street and railroad crossings, and the disposition of the material that will be excavated from the full canal section.

Bids have been invited for a small amount of preliminary work on this cut. The lowest bid received, 29 cents per cubic yard, was accepted, and work is to begin July 1.

Specifications for the larger part of the remaining excavation along the cut have been prepared and forwarded, with a view to doing the work by formal contract. The work of clearing the site of the lower lock and dam, in preparation for an accurate survey and detailed plans and estimates for the lock and dam began in June.

A system of observations for procuring accurate data in reference to evaporation and precipitation was inaugurated in the latter part of June with a view to beginning the observations early in July.

All boundaries of real estate owned by the Government in connection with this work were restaked approximately, and plans and estimates prepared for permanent boundary marks.

Pending the completion of the surveys and the compilation of accurate hydraulic data as above outlined, and the full discussions of the same, general studies for the final plans have been continued, and detailed plans for a number of similar works in different countries have been received.

### *Money statement.*

| | |
|---|---:|
| July 1, 1900, balance unexpended | $170,000.00 |
| June 30, 1901, amount expended during fiscal year | 7,022.34 |
| July 1, 1901, balance unexpended | 162,977.66 |
| July 1, 1901, outstanding liabilities | 672.74 |
| July 1, 1901, balance available | 162,304.92 |
| July 1, 1901, amount covered by uncompleted contracts | 92,460.00 |
| Amount (estimated) required for completion of existing project | 6,500,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 2,000,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

APPROPRIATIONS.

| | |
|---|---:|
| Act of— | |
| August 18, 1894 | $25,000 |
| June 3, 1896 | 150,000 |
| Total | 175,000 |

### CONTRACT IN FORCE DURING FISCAL YEAR.

Name of contractor: Puget Sound Bridge and Dredging Company.
Date of contract: May 13, 1901.
Date of approval: May 28, 1901.
Date of commencement: July 3, 1901.
Date of completion: December 3, 1901.

### EMERGENCY CONTRACT.

Name of contractor: Henningsen & Fortiner.
Date of contract: June 29, 1901.
Date of commencement: June 29, 1901.
To be completed as soon as practicable.

---

### COMMERCIAL STATISTICS.

The statistics for Seattle were compiled from the Trade Register of Seattle; those for Salmon Bay (Ballard) and Lakes Union and Washington were prepared under direction of the United States Engineer Office.

#### *Seattle, Wash.*

SHIPPING.

| | Arrived. | | Departed. | |
|---|---|---|---|---|
| | Number. | Tonnage. | Number. | Tonnage. |
| Steam vessels | 639 | 740,998 | 628 | 730,812 |
| Sail vessels | 209 | 189,802 | 200 | 180,295 |

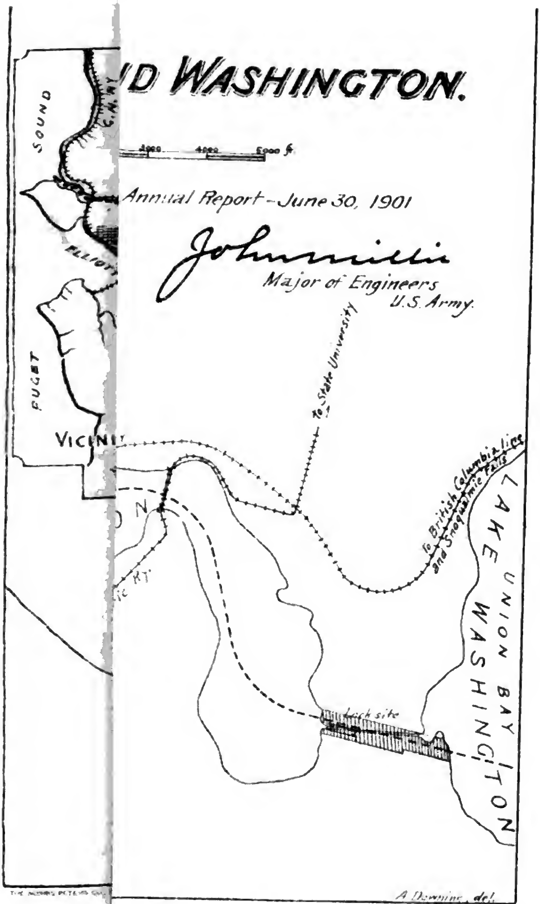
EXPORTS AND IMPORTS.

| Articles. | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons.* | | *Tons.* | |
| Beer | 2,867 | $172,000 | | |
| Cement | | | 17,761 | $355,857 |
| Coal | 478,562 | 1,432,706 | | |
| Cotton | 8,986 | 1,422,740 | | |
| Fish | | | 1,222 | 86,860 |
| Flour and feed | 63,281 | 1,578,527 | | |
| Wheat | 27,455 | 512,474 | | |
| Lumber and products | 74,022 | 426,054 | | |
| Tea | | | 1,509 | 1,207,200 |
| Miscellaneous merchandise | 258,763 | 25,042,132 | 135,116 | 15,736,058 |
| Total | 913,936 | 30,588,633 | 155,608 | 17,385,975 |

#### *Salmon Bay (Ballard).*

SHIPPING.

| | Arrived. | | Departed. | |
|---|---|---|---|---|
| | Domestic. | Foreign. | Domestic. | Foreign. |
| Steam vessels | 8 | 4 | 8 | 4 |
| Sail vessels | 42 | 3 | 42 | 3 |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Annual Report - June 30, 1901
John Millis
Major of Engineers
U.S. Army.
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RY.
to State University
to British Columbia lines and Snoqualmie Falls
LAKE WASHINGTON
UNION BAY
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A. Downing, del.

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EXPORTS AND IMPORTS.

| Articles. | Exports. |  | Imports. |  |
|---|---|---|---|---|
|  | Quantity. | Value. | Quantity. | Value. |
|  | *Tons.* |  | *Tons.* |  |
| Lumber | 30,495 | $206,375 | ........... | ........... |
| Miscellaneous merchandise | 10 | 400 | 50 | $1,000 |
| Total | 30,505 | 206,775 | 50 | 1,000 |

Thirty-nine million four hundred thousand feet B. M. of logs were towed to the mills at Ballard.

*Lakes Union and Washington.*

LOCAL TRAFFIC.

| Articles. | Quantity. | Value. |
|---|---|---|
|  | *Tons.* |  |
| Coal | 27,648 | $42,199 |
| Logs | 58,676 | 159,013 |
| Lumber | 1,940 | 15,880 |
| Piles | 1,300 | 3,250 |
| Shingle bolts | 12,160 | 8,282 |
| Telegraph poles | 2,500 | 12,500 |
| Wood | 2,000 | 6,000 |
| Miscellaneous merchandise | 1,160 | 53,450 |
| Total | 107,684 | 300,574 |

Passengers carried between local points, 80,680.

## X X 7.

## IMPROVEMENT OF EVERETT HARBOR, WASHINGTON.

Construction work under the continuing contract with the Seattle Bridge Company was greatly delayed owing to delays in the completion of their dredging plant. Bulkhead construction began October 17, and dredging started December 10. A total length of 8,182 feet of bulkhead construction and repairs was done. Dredging extended over 4,900 feet of the harbor basin and channel, but not all of this length was completed. The following table shows the quantities of dredging done and the material placed and the cost:

| Material. | Unit. | Quantity. | Amount. |
|---|---|---|---|
| Dredging ........ cubic yards | $0.09 | 739,179.76 | $66,526.17 |
| Piles ........ linear feet | .08 | 56,109 | 4,488.72 |
| Lumber ........ feet B. M. | 14.00 | 81,396 | 1,139.54 |
| Fascines ........ cords | 3.00 | 19,787.18 | 59,361.54 |
| Stone ........ tons | .95 | 5,723.32 | 5,437.15 |
| Total | .......... | .............. | 136,953.12 |

Some modifications of the details of the bulkhead construction were approved April 16, 1901. The object of the changes was to secure a more substantial construction.

The revised estimate of cost which these changes necessitated was as follows:

*Extension and repair and return of bulkhead to vicinity of low-tide line.*

| Material. | Unit. | Quantity. | Amount. |
|---|---|---|---|
| Dredging ........cubic yards.. | $0.09 | 2,585,000 | $232,650 |
| Piles........linear feet.. | .08 | 60,360 | 4,829 |
| Lumber ........M.. | 14.00 | 417.2 | 5,841 |
| Fascines ........cords.. | 3.00 | 26,385 | 79,155 |
| Stone ........tons (2,000 lb.).. | .95 | 33,541 | 31,864 |
| Total ........ | ........ | ........ | 354,339 |

Soon after active construction work began I was advised that the plans for the improvement were not satisfactory to the interests that would be affected. On January 14 I addressed letters to all the persons and firms I could learn of as likely to be interested, inviting an expression of views. Nothing definite was developed in the way of objections, the replies either indicating concurrence in the plan or indifference. Subsequently, on April 2, the Chamber of Commerce of Everett addressed a communication to the Secretary of War through this office, expressing objections to the plan, with reason, and suggesting changes. The proposed changes were adversely reported upon by me and the chamber of commerce was advised by the Secretary of War, April 29, that no change of plan could be made without authority of Congress.

Some modifications of the project for this work now appear to be desirable.

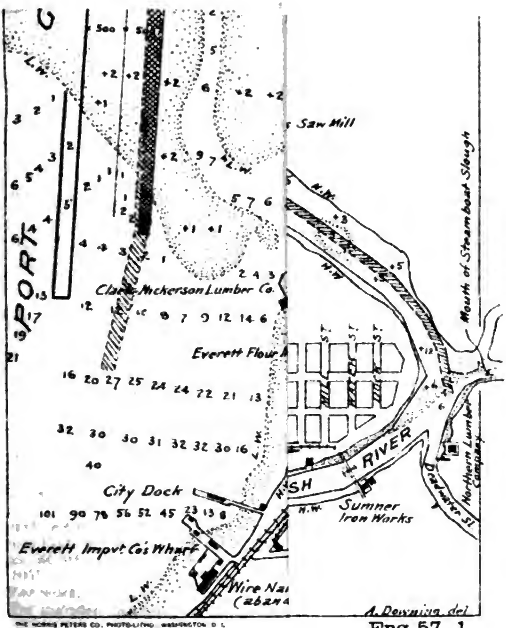
*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended ........ | $180,865.98 |
| Amount appropriated by sundry civil act approved March 3, 1901....... | 90,000.00 |
| | 270,865.98 |
| June 30, 1901, amount expended during fiscal year ........ | 114,066.68 |
| July 1, 1901, balance unexpended........ | 156,799.30 |
| July 1, 1901, outstanding liabilities ........ | 331.00 |
| July 1, 1901, balance available........ | 156,468.30 |
| July 1, 1901, amount covered by uncompleted contracts........ | 169,988.06 |
| Amount (estimated) required for completion of existing project ....... | 117,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 ........ | 117,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

APPROPRIATIONS.

Act of—

| | |
|---|---|
| August 18, 1894 ........ | $10,000 |
| June 3, 1896 ........ | 20,000 |
| March 3, 1899........ | 50,000 |
| June 6, 1900 ........ | 135,000 |
| March 3, 1901........ | 90,000 |
| Total ........ | 305,000 |



THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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### CONTRACT IN FORCE DURING FISCAL YEAR.

Contractor: Seattle Bridge Company.
Date of contract: December 29, 1899.
Date of approval: January 16, 1900.
Date of commencement: July 22, 1900.
Date of completion (continuing contract).

### COMMERCIAL STATISTICS.

Everett is in the collection district of Puget Sound, and is a subport of entry.

Three ocean-going steamers, with an aggregate gross tonnage of 6,248 tons, and 11 sound and river steamers, with an approximate gross tonnage of 800 tons, were engaged in traffic.

One shipyard, one flour mill, one saw mill, and one shingle mill, were added to the industries during the year.

*Shipping.*

| | Domestic. | | Foreign. | |
|---|---|---|---|---|
| | Arrived. | Departed. | Arrived. | Departed. |
| Steam vessels | 25 | 25 | 3 | 3 |
| Sail vessels | 6 | 6 | | |

*Exports and imports.*

| Articles. | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons.* | | *Tons.* | |
| China clay | | | 920 | $8,400 |
| Grain, etc | 50 | $1,000 | 150 | 3,000 |
| Lime rock | | | 2,600 | 3,900 |
| Lead | 1,340 | 107,200 | | |
| Lumber | 29,522 | 148,471 | | |
| Ore | 205 | 20,500 | 630 | 61,250 |
| Miscellaneous merchandise | 1,808 | 141,860 | 12,094 | 880,980 |
| Paper | 5,175 | 414,000 | | |
| Soda ash | | | 600 | 20,000 |
| Total | 38,100 | 833,031 | 16,994 | 987,530 |

## X X 8.

## IMPROVEMENT OF SWINOMISH SLOUGH, WASHINGTON.

No work was done during the year and no funds were expended except for inspection owing to the small balance available.

*Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | $4,591.07 |
| June 30, 1901, amount expended during fiscal year | | 17.50 |
| July 1, 1901, balance unexpended | | 4,573.57 |
| Amount (estimated) required for completion of existing project | | 47,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901: | | |
| For works of improvement | $47,000.00 | |
| For maintenance of improvement | 10,000.00 | |
| | | 57,000.00 |

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

### APPROPRIATIONS.

| Act of— | |
|---|---|
| July 13, 1892 | $25,000 |
| August 18, 1894 | 25,000 |
| June 3, 1896 | 25,000 |
| March 3, 1899 | 20,000 |
| Total | 95,000 |

### COMMERCIAL STATISTICS.

*Exports and imports.*

| Articles. | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons.* | | *Tons.* | |
| Agricultural implements | | | 500 | $50,000 |
| Fish, fresh | 1,400 | $60,000 | | |
| Grain | 30,000 | 600,000 | | |
| Grain bags | | | 100 | 35,000 |
| Hay | 21,000 | 210,000 | | |
| Live stock | 10,000 | 30,000 | | |
| Miscellaneous merchandise | 8,216 | 238,960 | 3,300 | 387,500 |
| Total | 70,616 | 1,138,960 | 3,900 | 472,500 |

150,000,000 feet B. M. of logs were towed through Swinomish Slough during the year.

## X X 9.

## IMPROVEMENT OF OKANOGAN RIVER, WASHINGTON.

Early in November, 1900, a small force was organized to resume work of improvement on the lower part of the river. Active operations began November 10 and were continued to the close of December, the working force and the tools and outfit being carried on Government barges. The work was principally at Crazy Rapids and at Rapids Nos. 18 and 20. About 1,145 bowlders were removed. A considerable amount of rock removal by blasting was done. A wing dam was built near Rapid No. 20 and posts were set at Rapid No. 18 for the assistance of vessels in ascending the rapid. At the close of work plant and property were secured and placed in charge of a watchman. The results of the season's work were permanently beneficial to navigation, though the effect was of course only local.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $2,125.63 |
| June 30, 1901, amount expended during fiscal year | 1,895.42 |
| July 1, 1901, balance unexpended | 230.21 |
| Amount (estimated) required for completion of existing project | 15,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 15,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

### APPROPRIATION.

| | |
|---|---|
| Act of March 3, 1899 | $15,000 |

## X X 10.

### IMPROVEMENT OF PEND OREILLE RIVER, WASHINGTON.

No work was done and no funds were expended under this appropriation during the year owing to the small balance available.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $1,260.29 |
| July 1, 1901, balance unexpended | 1,260.29 |
| Amount (estimated) required for completion of existing project | 20,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 10,000.00 |
| Submitted in compliance with requirements of sundry civil act of June 4, 1897. | |

APPROPRIATION.

| | |
|---|---|
| Act of March 3, 1899 | $10,000 |

COMMERCIAL STATISTICS.

The following statistics are furnished by Capt. J. W. Cusick, of the steamer *Volunteer:*

*Exports and imports.*

| Articles. | Exports. | | Imports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | *Tons.* | | *Tons.* | |
| Agricultural implements | | | 14 | $1,500 |
| Butter | 37 | $14,600 | | |
| Flour, feed, etc | | | 200 | 4,400 |
| Hay | 600 | 6,000 | | |
| Lumber | 340 | 1,490 | | |
| Miscellaneous merchandise | 267 | 27,825 | 463 | 41,310 |
| Total | 1,244 | 49,915 | 677 | 47,210 |

One river steamer, with a gross tonnage of 40 tons and draft of 30 inches, was engaged in traffic. Fifteen hundred passengers were carried.

## X X 11.

### IMPROVEMENT OF KOOTENAI RIVER, IDAHO, BETWEEN BONNERS FERRY AND THE INTERNATIONAL BOUNDARY LINE.

The only appropriation for this work was made in the river and harbor act of June 3, 1896.

No work was done and no expenditures were made during the fiscal year ending June 30, 1901.

An examination of the Kootenai River between Jennings, Mont., and the international boundary line, a length of about 80 miles, was authorized by the emergency river and harbor act of June 6, 1900. This examination was made by Capt. Harry Taylor, Corps of Engineers, the local engineer, and report submitted under date of June 21, 1900. It was the opinion of Captain Taylor, concurred in by the division engineer and the Chief of Engineers, that this portion of the Kootenai River was not worthy of further improvement by the Government for the reason that on account of improved railroad facilities navigation on the river had practically ceased. I therefore recommend the discontinuance of appropriations for that part of the Kootenai River between Jennings, Mont., and the international boundary line. Idaho and Montana.

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $745.46 |
| July 1, 1901, balance unexpended | 745.46 |

### APPROPRIATION.

| | |
|---|---|
| Act of June 3, 1896 | $5,000 |

### COMMERCIAL STATISTICS.

The only statistics obtainable are as follows:

| | |
|---|---|
| Exports | $14,585 |

Three steamers were engaged in traffic on the Kootenai River, with aggregate gross tonnage of 396 tons. One hundred passengers were carried. Three million seventy-three thousand feet B. M. of logs were towed on the river.

The above commercial statistics were furnished by the collector of customs at Great Falls, Mont., and the postmaster at Bonners Ferry, Idaho.

## X X 12.

## IMPROVEMENT OF FLATHEAD RIVER, MONTANA.

Snagging operations were carried on with a hired boat during portions of the months of September and October, 1900. About 280 snags were taken out, and a large jam of driftwood was removed from the channel between Demarsville and Flathead Lake, a distance of about 27 miles. The only steamer of consequence now navigating this river has a draft of 24 inches. Flathead River is not connected with any navigable water outside the State of Montana. Its navigation is a matter of local interest only, and is of very limited extent. For these reasons I deem the river unworthy of further improvement by the Government, and I recommend the discontinuance of appropriations for this purpose.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $1,480.49 |
| June 30, 1901, amount expended during fiscal year | 1,291.26 |
| July 1, 1901, balance unexpended | 189.23 |
| Amount (estimated) required for completion of existing project | Indefinite. |

APPROPRIATION.

| | |
|---|---|
| Act of June 3, 1896 | $10,000 |

COMMERCIAL STATISTICS.

The following statistics were furnished by Mr. Geo. F. Stannard, of Kalispel, Mont.:

*Exports and imports.*

| | Tons. |
|---|---|
| Miscellaneous merchandise | 246 |
| Horses | 131 |
| Lumber | 79 |

Passengers carried, 2,191.

One steamer, with gross tonnage of 75 tons and draft of 2 feet, was employed regularly on the river.

## X X 13.

## EXAMINATION AND SURVEY OF TACOMA HARBOR, WASHINGTON.

[Printed in House Doc. No. 76, Fifty-sixth Congress, second session.]

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
*Washington, November 30, 1900.*

SIR: I have the honor to submit the accompanying copies of reports, dated June 22 and November 13, 1900, with maps,[1] by Capt. Harry Taylor, Corps of Engineers, upon preliminary examination and survey, respectively, of Tacoma Harbor, Washington, required by the provisions of the emergency river and harbor act of June 6, 1900.

The plan of improvement presented by Captain Taylor provides for the dredging of the city waterway to its full width to a depth of 25 feet at extreme low water from deep water in Commencement Bay to Eleventh street, to a depth of 18 feet at extreme low water from Eleventh street to Fourteenth street, and to a depth of 15 feet at extreme low water south of Fourteenth street, all at an estimated cost, in round numbers, of $444,000.

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[1] Not reprinted; printed in House Doc. No. 76, Fifty-sixth Congress, second session.

The local officer is of the opinion that the improvement of the City Waterway to the extent outlined in his report is a worthy one, but on account of the conditions of ownership along the water front, as explained in the report, he is uncertain whether the proposed work should be done by the General Government or by private interests.

In forwarding the survey report to this office, the division engineer, Col. S. M. Mansfield, Corps of Engineers, expressed the opinion that the harbor is worthy of improvement by the General Government to the extent outlined by the district officer.

Very respectfully, your obedient servant,

JOHN M. WILSON,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

Hon. ELIHU ROOT,
*Secretary of War.*

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## PRELIMINARY EXAMINATION OF TACOMA HARBOR, WASHINGTON.

UNITED STATES ENGINEER OFFICE,
*Seattle, Wash., June 22, 1900.*

GENERAL: I have the honor to submit the following report relative to the preliminary examination of Tacoma Harbor, Washington, in compliance with your letter of the 13th instant:

Under date of February 16, 1898, I submitted a report with map of a survey of the mouth of the Puyallup River, Washington, and under date of January 16, 1900, I submitted a report relative to certain improvements in Tacoma Harbor. The latter report was accompanied by statistics in regard to the commerce of Tacoma.

In view of the data which have been furnished in the reports above referred to, it is not deemed necessary to make any further preliminary examination of Tacoma Harbor. In my opinion the harbor is worthy of improvement. Additional surveys will be necessary in order to make a more exact estimate of the cost of the improvement, and it is estimated that the surveys will cost $500. It is thought that this would be a proper charge against the appropriation for improving Puget Sound and its tributary waters.

Very respectfully, your obedient servant,

HARRY TAYLOR,
*Captain, Corps of Engineers.*

Brig. Gen. JOHN M. WILSON,
*Chief of Engineers, U. S. A.*
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, PACIFIC DIVISION,
*San Francisco, Cal., June 27, 1900.*

Respectfully forwarded to the Chief of Engineers.

The opinion of the district officer, that the harbor is worthy of improvement, is concurred in and a survey, at an estimated cost of $500, is recommended.

S. M. MANSFIELD,
*Colonel, Corps of Engineers,*
*Division Engineer.*

[Second indorsement.]

OFFICE CHIEF OF ENGINEERS,
U. S. ARMY,
*July 6, 1900.*

Respectfully submitted to the Secretary of War.

The within report relates to preliminary examination of Tacoma Harbor, Washington, authorized by the emergency river and harbor act approved June 6, 1900.

The harbor is reported to be worthy of improvement, and I recommend that a survey be made and the cost of improvement be estimated. It is not thought such survey can be properly paid for from appropriation for Puget Sound and tributary waters, as proposed by Captain Taylor, but that it must be provided for by an allotment from the appropriation of June 6, 1900.

JOHN M. WILSON,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

[Third indorsement.]

WAR DEPARTMENT,
*July 9, 1900.*

Approved as recommended by the Chief of Engineers.

By order of the Secretary of War:

JOHN C. SCOFIELD,
*Chief Clerk.*

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## SURVEY OF TACOMA HARBOR, WASHINGTON.

UNITED STATES ENGINEER OFFICE,
*Seattle, Wash., November 13, 1900.*

GENERAL: I have the honor to forward herewith report of survey of Tacoma Harbor, Washington, made in compliance with instructions contained in your letter of August 25, 1900.

In my opinion, the improvement outlined in the report—that is, dredging in the City Waterway—is a worthy improvement and is urgently needed at the present time. Whether this improvement should be made by the Government or by private interests on account of the conditions surrounding this waterway, as explained in the report, seems uncertain to me, and I have left this question open for higher authority to decide.

Very respectfully, your obedient servant,

HARRY TAYLOR,
*Captain, Corps of Engineers.*

Brig. Gen. JOHN M. WILSON,
*Chief of Engineers, U. S. A.*
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, PACIFIC DIVISION,
*San Francisco, Cal., November 20, 1900.*

Respectfully forwarded to the Chief of Engineers, United States Army.

Tacoma Harbor is, in my opinion, worthy of improvement by the General Government to the extent outlined in the report of the district officer.

S. M. Mansfield,
*Colonel, Corps of Engineers,*
*Division Engineer.*

## REPORT OF CAPT. HARRY TAYLOR, CORPS OF ENGINEERS.

United States Engineer Office,
*Seattle, Wash., November 13, 1900.*

General: I have the honor to submit the following report of a survey of Tacoma Harbor, Washington, made in compliance with instructions contained in your letter of August 25, 1900:

The city of Tacoma is located on the western and southern sides of Commencement Bay. At the southern end of the bay are extensive tide flats, which are bare at low water. Outside of these tide flats the depth increases very rapidly up to depths of 200 feet or more, reaching depths as great as 600 feet at the mouth of the bay, about 3 miles distant from the low-water line at its southern end. The principal water front of Tacoma is along the southwestern shore of the bay. Harbor lines have been established around the south end of the bay and along its western side. In order to facilitate commerce two waterways have been laid out; one of these is known as the City or West Waterway and the other as the Puyallup Waterway. The harbor of Tacoma may be considered to embrace all of the southwestern part of Commencement Bay, including the waterways mentioned.

Under date of February 16, 1898, I submitted a report on the survey of the mouth of the Puyallup River, Washington, which included the Puyallup Waterway. My report was published in House Document No. 345, Fifty-fifth Congress, second session, and also in Report of Chief of Engineers for the fiscal year ending June 30, 1898, page 3098 et seq. For reasons given in my report, I stated that I did not consider Puyallup Waterway as worthy of improvement at that time. This opinion was concurred in by the division engineer. The conditions in regard to the improvement of Tacoma Harbor have not materially changed since that time. It is true that there has been a very material increase in the commerce of Tacoma since my previous report was submitted, but for reasons which will be given later on it is not believed that the change has been sufficient to make it necessary to make any improvement of the Puyallup Waterway at the present time. It has been stated that it is desired to make such improvement of the Puyallup Waterway and of the Puyallup River as will convert the same into a fresh-water basin. This would include the building of a large and expensive lock and a vast amount of dredging. It is not believed that the present needs of the commerce of Tacoma justify any such expenditure; and as the previous report contained an estimate for dredging the Puyallup Waterway, which was not recommended, it has not been thought necessary to make any further survey of the Puyallup Waterway.

The harbor outside of the waterways is already of ample depth and needs no improvement. The survey was therefore confined to the City or West Waterway.

Statistics are forwarded herewith which show that the commerce of Tacoma is a very extensive and a very rapidly growing one. As stated above, the water in Commencement Bay deepens very rapidly from the shore. The increase of depth is so rapid that it is practicable to build wharves only parallel to the shore. Thus while the water front is a comparatively long one, it makes the room available for shipping very small, and the wharf facilities at Tacoma at the present time are entirely too restricted for the commerce which now seeks that port. Some improvement of the harbor is urgently needed at the present time, and it is believed that this improvement can be made by dredging the City Waterway. It should be remarked, however, that the conditions at Tacoma in regard to the ownership of the water front are peculiar. Practically the entire available water front at the present time between what is known as the old Tacoma mill to the South Eleventh Street Bridge, a distance of approximately 26,500 feet, is owned by the Northern Pacific Railroad. South of the Eleventh Street Bridge by far the greater percentage of the water front on both sides of the waterway is owned by the Tacoma Land and Improvement Company. North of the Eleventh Street Bridge the Tacoma Land and Improvement Company owns all of the water front on the east side of the City Waterway except a strip of tide land about 1,000 feet long, which is owned by the State of Washington.

The improvement of the City Waterway by the Government would therefore be most entirely for the direct benefit of these two corporations, but the interests of these two corporations are so intimately connected with the interests of Tacoma that what is for the benefit of these corporations at this place is undoubtedly for the benefit of Tacoma and its commerce. It should also be remarked that the greater part of the exports and imports in the tables herewith, particularly those of the greatest value per ton, are the imports and exports carried by the steamers running in connection with the Northern Pacific Railroad. If the imports and exports carried by those steamers and the wheat which is loaded from the railroad company's warehouses were left out of consideration, the commercial statistics shown would be very much reduced; but, as stated above, the Northern Pacific Railroad owns practically all of the present available water front, and even what commerce there is, exclusive of that just referred to, is very much cramped. The Northern Pacific Railroad Company during the past few months has been carrying on extensive dredging operations in the City Waterway in order that additional room might be obtained for building warehouses with suitable docks in front of them farther south on the City Waterway than it has heretofore been possible to build them. In fact, since the map which is forwarded herewith was made these dredging operations have been carried on, and the estimates which are submitted of the amount of material to be removed can only be considered as approximate for that reason.

On October 19, 1900, a contract was entered into between Mr. Robert Bridges, commissioner of public lands of the State of Washington, and Mr. R. B. Lehman, of Tacoma, and approved by the Hon. J. R. Rogers, governor, for excavating lands belonging to the State of Washington in the harbor of Tacoma. A copy of this contract and an extract from the law under authority of which it was made are forwarded herewith. It seems doubtful whether, in view of this contract and of the conditions in regard to the ownership of lands around the City Waterway, the United States should undertake the improvement of this waterway.

That the improvement of this waterway is needed is not doubtful, but who should make the improvement is doubtful. In case it is improved by the United States, a release from liability to damage should be obtained from the State of Washington and the owner of the contract referred to, and a right to deposit material wherever desired, whether on adjacent tide lands or in deep water of Commencement Bay, should be secured. This would involve also a release from liability to damage from the owners of the abutting lands. It should also be noted that the waterway is crossed by two bridges with draw piers approximately in the center of the waterway. Whether or not these piers have deep enough foundations to permit of the dredging in their vicinity without danger is open to question.

The improvement which is proposed is to dredge the City Waterway to its full width to a depth of 25 feet at extreme low water from deep water in Commencement Bay to Eleventh street, to a depth of 18 feet at extreme low water from Eleventh street to Fourteenth street, and to a depth of 15 feet at extreme low water south of Fourteenth street. This will provide additional room for deep-sea shipping, and by giving additional room for the shallower draft boats which ply on Puget Sound only, relieve the present wharves of much congestion of boats alongside them.

The south end of the city waterway has been used by the mills adjacent to it for many years as a storage basin for logs and has been encroached upon by the mills, so that the southern end is full of débris and refuse from these mills. Before its improvement can be completed it will be necessary for these mills to entirely change their methods of handling their logs. The storage of the logs in the waterway in the manner in which it is done would be a serious obstruction to navigation were there sufficient depth of water for navigation. In fact, there can be no navigation so long as conditions are as they are at present.

It is estimated that the project outlined above will require the removal of the following quantities of material:

*Estimate.*

| Locality. | Depth below extreme low water. | Cubic yards. |
|---|---|---|
| | *Feet.* | |
| From deep water to Eleventh street | 25 | 1,638,000 |
| From Eleventh street to Fourteenth street | 18 | 479,000 |
| From Fourteenth street to south end of waterway | 15 | 575,000 |
| Total | | 2,692,000 |

It is estimated that the cost of moving this material will be 15 cents per cubic yard, or $403,800. To this must be added the cost of engineering, superintendence, and contingencies, estimated at 10 per cent, making the cost of the improvement $444,180, or, in round numbers, $444,000.

The unit price of 15 cents per cubic yard is somewhat high, but it is placed at that on account of the condition of the south end of the area to be dredged, where, it is believed, will be found old piles, slabs, and all sorts of refuse, which will prove difficult and expensive to excavate.

I am indebted to Mr. O. B. Hayden, manager Tacoma Land Company, for the very complete commercial statistics herewith.

Respectfully submitted.

HARRY TAYLOR,
*Captain, Corps of Engineers.*

Brig. Gen. JOHN M. WILSON,
*Chief of Engineers, U. S. A.*

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[Extract from Code of Civil Statutes.]

### EXCAVATION OF WATERWAYS BY PRIVATE PARTIES.

2853. AUTHORITY OF COMMISSIONER.—The commissioner of public lands of the State of Washington may, when in his judgment the interests of commerce would be subserved thereby, enter into contract with any person or persons or incorporated companies doing business in the State of Washington for the excavation of any waterway or waterways through any lands belonging to the State of Washington or to any citizen or corporation of said State, and for the filling in and raising above high tide of any tide or shore lands belonging to the State of Washington, and upon the completion of such contract such person or persons or incorporated company shall become entitled to and shall have a lien, as in this act provided, upon all tide and shore lands belonging to the State of Washington adjacent to such waterway and remaining unsold at the date of the approval of this act that they may fill in and raise above high tide, and all purchasers of said tide and shore lands from the State of Washington shall take the same subject to said lien: *Provided, however,* That such contract shall not become binding or operative until approved by the governor, nor until such person or persons or incorporated company shall have filed with the commissioner of public lands a bond in the penal sum of not less than twenty-five hundred nor more than twenty-five thousand dollars, as in the judgment of said commissioner of public lands shall be considered necessary in a particular case, with sureties to be approved by said commissioner of public lands, said bond to be conditioned for the faithful performance of said contract: *Provided further,* That no lands shall be affected thereby except lands within or in front of incorporated cities or towns, or within one mile thereof of either side, or lands between any inner and outer harbor lines established by proper authority. (1893, 241, 1.)

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### CONTRACT BETWEEN THE STATE OF WASHINGTON AND R. B. LEHMAN.

This contract, between the State of Washington, by its commissioner of public lands, as authorized by law, the party of the first part, and R. B. Lehman, a citizen of said State and of the United States, over the age of twenty-one years, the party of the second part,

Witnesseth: That the party of the second part having heretofore complied with *all* the preliminary requirements of the act of the legislature of the State of Washington, approved March 9, 1893, entitled "An act prescribing the way in which waterways for the uses of navigation may be excavated by private contract, providing for *liens* upon tide and shore lands belonging to the State, granting rights of way across lands belonging to the State," the party of the first part aforesaid does hereby let and grant to the said party of the second part, his heirs and assigns, the contract for the excavation through lands belonging to the State of Washington of the "city waterway," as heretofore established by the harbor-line commission of the State of Washington, as shown upon the maps filed in the office of the commissioner of public lands of said State by the board of tide-land appraisers thereof, on February 3rd, 1895, and for the filling in and raising above high tide of the following described tide and shore lands belonging to the State of Washington and situate in the county of Pierce, in said State, to-wit:

Blocks thirty-three (33), thirty-eight (38), and forty (40), and so much of Railroad avenue, South Eleventh street, and St. Paul avenue as abut upon said blocks to the center line thereof, all as shown upon said map of Tacoma tide lands, and within the city of Tacoma, in said county and State.

*Provided*, That this contract shall not apply to so much of said block forty (40) and Railroad avenue abutting on the same, within the Old South Channel of the Puyallup River, as shall hereafter be laid out by the said commissioner of public lands as a public waterway with the consent of the owners of the lands along proposed waterway; and no lien shall attach under this contract to or upon any part of said block forty (40) lying within the limits of the waterway so established or any street or streets appearing on said plat of Tacoma tide lands.

That accompanying this contract, marked "Exhibit A," and attached thereto is a map of the locality (being a copy of said official map thereof) showing said waterway and its relation to the harbor lines and reservations in front of said city of Tacoma and said tide and shore lands to be filled in and raised above high tide and specifying and exhibiting the waterway proposed to be excavated as to its depth and width and extent, that is to say: Said waterway, as shown upon said map, except that part lying within the boundaries of South 11th street produced, is to be excavated to the depth of twenty-two feet, more or less, as may be determined from time to time by said commissioner of public lands, but in no case to be more than twenty-six feet below mean low tide, to at least two-thirds ($\frac{2}{3}$) of its width at the bottom along the middle of said waterway, with side slopes as may be necessitated by the character of the material encountered along the way; and the land hereinbefore described to be filled shall be filled to the height of two feet above mean high tide, provided that the price and cost for excavation and embankment shall be sixteen (16) cents per cubic yard.

That accompanying this contract, marked "Exhibit B," and attached hereto are drawings and specifications of bulkheads, with prices therefor in case they are required; but owing to the fact that most of the lands surrounding the tract to be filled under this agreement have already been filled, and as none of the lands to be filled under this contract lies within less than two hundred feet of any waterway or wharf line, it is deemed unnecessary to burden the land to be filled with the cost of any bulkhead or restraining works unless unforeseen difficulties require the use of the same at some point, in which case they are to be constructed and paid for as stated in said "Exhibit B."

The said party of the second part, for himself, his heirs and assigns, hereby agrees to begin work on such excavation of said waterway and such filling in of said tide lands on or before six months from the execution of this contract, and to complete said work within four and one-half years from the execution of this contract, and to do and perform all acts and things provided in said act of the legislature to be done and performed by a party taking the benefit of said act.

The party of the first part hereby grants unto the party of the second part, his heirs and assigns, all necessary rights of way of ingress and egress and of possession and the right to comply with all the provisions of said act for the purposes of this contract, and hereby agrees that it will, upon compliance with this contract as to the whole or any part thereof, as specified in said law, by the party of the second part, his heirs and assigns, grant to him, his heirs and assigns, a lien upon said blocks thirty-three (33), thirty-eight (38), and forty (40) (except so much thereof as lies within the waterway to be established, as hereinbefore mentioned), as provided in said hereinbefore-mentioned act of the legislature, and that in pursuance of said law and the notice heretofore given by the party of the second part, as provided in said law, and the other acts done and performed heretofore by the party of the second part in pursuance of said law, it will hold the tide lands hereinbefore described subject to the operation of this contract pending its execution, and subject to the ultimate lien thereon provided for in said law and this contract, and that it will do and perform by its authorized agents all and singular the acts and things mentioned and set forth in said act of the legislature to be done and performed by the State of Washington.

The party of the first part hereby waives the right to insist upon payment of the amount due upon any lien acquired under this contract in ten annual installments, as provided by said act, and consents that payment may be made of the full amount due provided it is made within thirty days from the date of the commissioner's certificate, but if payment is not so made within said thirty days, then they shall be made in the manner specified in said act.

This contract shall take effect and be in force from and after its execution by said commissioner of public lands and approval by the governor of said State, and the filing with the commissioner of public lands by the party of the second part, his heirs or assigns, of a bond with good and sufficient sureties in the penal sum of ten thousand dollars for the faithful performance of this contract as provided in said act.

In witness whereof the parties have hereunto set their hands and seals in duplicate this 19th day of October, A. D. 1900.

Robert Bridges, [seal.]
*Commissioner of Public Lands.*
R. B. Lehman. [seal.]

[state seal.]

I hereby approve the foregoing contract.

J. R. Rogers, *Governor.*

*Statement showing tonnage of principal products, exports and imports, port of Tacoma, Wash.*

EXPORTS.

| Month. | Year. | Wheat. | Lumber. | Coal. | Flour. | Cotton. | Tobacco. |
|---|---|---|---|---|---|---|---|
| | | *Bushels.* | *Million feet.* | *Long tons.* | *Barrels.* | *Tons.* | *Tons.* |
| October | 1898 | 623,853 | 7.50 | 53,312 | 31,605 | 388 | 552 |
| November | 1898 | 1,192,256 | 8.25 | 52,632 | 25,556 | 350 | 122 |
| December | 1898 | 615,220 | 7.50 | 46,986 | 45,402 | 783 | 865 |
| January | 1899 | 884,013 | 7 | 43,457 | 36,777 | 2,650 | 62 |
| February | 1899 | 487,788 | 5.75 | 28,195 | 35,838 | 1,934 | 58 |
| March | 1899 | 383,773 | 3.75 | 38,291 | 27,456 | 650 | 210 |
| April | 1899 | 176,215 | 4 | 35,850 | 27,925 | 575 | 483 |
| May | 1899 | 221,154 | 5.50 | 34,250 | 56,616 | 245 | 635 |
| June | 1899 | 102,159 | 14.25 | 41,986 | 23,011 | 260 | 593 |
| July | 1899 | 274,775 | 7.50 | 37,990 | 37,717 | ........ | ........ |
| August | 1899 | 138,630 | 11 | 31,209 | 26,085 | ........ | ........ |
| September | 1899 | 705,694 | 12.25 | 38,173 | 25,077 | ........ | ........ |
| Total | | 5,805,530 | 94.25 | 482,331 | 399,095 | 7,835 | 3,580 |
| Monthly average | | 483,794 | 7.85 | 40,194 | 33,258 | 653 | 298 |
| October | 1899 | 795,694 | 7.75 | 39,059 | 10,670 | ........ | ........ |
| November | 1899 | 122,759 | 7.50 | 50,363 | 104,996 | 711 | ........ |
| December | 1899 | 426,600 | 5 | 47,293 | 96,624 | 4,217 | 71 |
| January | 1900 | 199,589 | 8.75 | 40,100 | 82,290 | 1,790 | ........ |
| February | 1900 | 317,141 | 4.25 | 38,120 | 57,494 | 2,939 | ........ |
| March | 1900 | 304,313 | 9 | 51,560 | 96,605 | 3,557 | ........ |
| April | 1900 | 435,819 | 4.50 | 47,486 | 127,032 | 550 | ........ |
| May | 1900 | 252,573 | 6.25 | 71,324 | 49,669 | ........ | ........ |
| June | 1900 | 109,445 | 8 | 55,860 | 14,555 | ........ | 100 |
| Total | ...... | 2,963,933 | 61 | 441,165 | 639,935 | 13,764 | 171 |
| Monthly average | ...... | 329,326 | 6.78 | 49,018 | 71,104 | 1,529 | 19 |

IMPORTS.

| Month. | Year. | Tea. | Sugar. | Silk. | Rice. | Curios. | Straw braid and matting. |
|---|---|---|---|---|---|---|---|
| | | *Tons.* | *Tons.* | *Tons.* | *Tons.* | *Tons.* | *Tons.* |
| October | 1898 | 1,558 | 425 | 76 | 157 | 65 | 83 |
| November | 1898 | 668 | 246 | 85 | 228 | 72 | 48 |
| December | 1898 | 460 | 215 | 58 | 387 | 121 | 52 |
| January | 1899 | 342 | 35 | 60 | 289 | 71 | 122 |
| February | 1899 | 352 | 310 | 144 | 367 | 65 | 311 |
| March | 1899 | 180 | 380 | 126 | 186 | 85 | 185 |
| April | 1899 | 35 | 335 | 128 | 210 | 83 | 180 |
| May | 1899 | 61 | 462 | 112 | 360 | 52 | 145 |
| June | 1899 | ........ | 350 | 256 | 258 | 25 | 134 |
| July | 1899 | 1,780 | 400 | 375 | 316 | 53 | 148 |
| August | 1899 | 1,218 | 450 | 255 | 212 | 95 | ........ |
| September | 1899 | 1,320 | 382 | ........ | 179 | 85 | 285 |
| Total | ...... | 7,974 | 3,990 | 1,675 | 3,149 | 872 | 1,693 |
| Monthly average | ...... | 665 | 332 | 140 | 262 | 73 | 141 |
| October | 1899 | 773 | 356 | 36 | ........ | 75 | 30 |
| November | 1899 | 1,321 | 206 | ........ | 363 | 96 | 1,105 |
| December | 1899 | 285 | 161 | 63 | 60 | ........ | 217 |
| January | 1900 | 423 | 256 | 22 | 203 | 122 | 870 |
| February | 1900 | 55 | 254 | 36 | 215 | 46 | 1,185 |
| March | 1900 | 95 | 313 | 23 | ........ | ........ | 775 |
| April | 1900 | ........ | 381 | ........ | 16 | 12 | 153 |
| May | 1900 | 52 | 419 | ........ | 89 | 26 | 275 |
| June | 1900 | 169 | 570 | ........ | ........ | 33 | 323 |
| Total | ...... | 3,173 | 2,916 | 180 | 976 | 410 | 4,938 |
| Monthly average | ...... | 353 | 324 | 20 | 108 | 45 | 547 |

*Comparative statement of deep-sea trade for the period of nine months, viz, from October 1, 1898, to July 1, 1899, and from October 1, 1899, to July 1, 1900.*

| | October 1, 1898, to July 1, 1899. | October 1, 1899, to July 1, 1900. | Per cent of gain. |
|---|---|---|---|
| **Registered tonnage:** | | | |
| Inward ........tons... | 594,526 | 630,355 | 6.026 |
| Outward ........do.... | 607,935 | 605,432 | *a* .401 |
| **Cargo tonnage:** | | | |
| Inward ........do.... | 46,457 | 79,838 | 71.855 |
| Outward ........do.... | 684,402 | 753,374 | 9.155 |
| **Value of imports** ........ | $4,139,900.80 | $5,705,700.97 | 37.822 |
| **Value of exports** ........ | $9,709,643.72 | $11,353,513.37 | 18.146 |

*a* Loss.

*Statement showing deep-sea commerce of the port of Tacoma, Wash.*

| Month. | Year. | Vessels arrived. | Vessels departed. | Registered tonnage. | | Cargo tonnage. | |
|---|---|---|---|---|---|---|---|
| | | | | Inward. | Outward. | Inward. | Outward. |
| October ........ | 1898 | 70 | 66 | 85,917 | 94,323 | 6,800 | 78,454 |
| November ........ | 1898 | 64 | 60 | 80,950 | 78,229 | 5,270 | 95,099 |
| December ........ | 1898 | 53 | 53 | 74,698 | 68,415 | 1,760 | 92,941 |
| January ........ | 1899 | 44 | 52 | 62,512 | 76,409 | 4,181 | 87,850 |
| February ........ | 1899 | 41 | 41 | 57,794 | 55,050 | 7,244 | 69,576 |
| March ........ | 1899 | 41 | 42 | 58,102 | 57,898 | 4,358 | 60,363 |
| April ........ | 1899 | 40 | 38 | 62,742 | 50,781 | 4,515 | 54,672 |
| May ........ | 1899 | 38 | 43 | 49,884 | 61,160 | 4,897 | 64,446 |
| June ........ | 1899 | 46 | 45 | 61,927 | 65,670 | 7,432 | 81,001 |
| July ........ | 1899 | 42 | 44 | 55,649 | 60,085 | 7,127 | 66,545 |
| August ........ | 1899 | 54 | 46 | 60,908 | 51,796 | 10,006 | 48,361 |
| September ........ | 1899 | 46 | 51 | 54,686 | 56,614 | 5,478 | 72,615 |
| Total ........ | ...... | 579 | 561 | 765,769 | 776,430 | 69,068 | 871,943 |
| Monthly average ........ | ...... | 48 | 48 | 63,814 | 64,702 | 5,756 | 72,662 |
| October ........ | 1899 | 48 | 46 | 58,783 | 60,084 | 9,030 | 83,529 |
| November ........ | 1899 | 47 | 50 | 62,797 | 63,682 | 12,227 | 90,048 |
| December ........ | 1899 | 54 | 50 | 72,857 | 66,453 | 10,418 | 85,979 |
| January ........ | 1900 | 40 | 48 | 51,625 | 63,528 | 5,631 | 81,580 |
| February ........ | 1900 | 52 | 39 | 66,583 | 54,524 | 9,996 | 62,970 |
| March ........ | 1900 | 59 | 59 | 77,037 | 65,812 | 8,802 | 97,890 |
| April ........ | 1900 | 48 | 53 | 80,673 | 70,956 | 5,176 | 80,231 |
| May ........ | 1900 | 68 | 69 | 93,498 | 87,179 | 10,544 | 96,789 |
| June ........ | 1900 | 48 | 50 | 66,352 | 73,214 | 8,014 | 75,358 |
| Total ........ | ...... | 464 | 464 | 630,155 | 605,432 | 79,838 | 754,374 |
| Monthly average ........ | ...... | 52 | 52 | 70,039 | 67,270 | 8,871 | 83,819 |

| Month. | Year. | Vessels departed. | | Steam vessels. | Sailing vessels. | Value of imports. | Value of exports. |
|---|---|---|---|---|---|---|---|
| | | Foreign. | Domestic. | | | | |
| October ........ | 1898 | 11 | 55 | 44 | 22 | $466,952.19 | $1,242,975.00 |
| November ........ | 1898 | 13 | 47 | 38 | 22 | 480,544.61 | 1,327,545.49 |
| December ........ | 1898 | 12 | 41 | 27 | 26 | 167,654.00 | 1,421,215.50 |
| January ........ | 1899 | 16 | 36 | 26 | 26 | 635,265.00 | 1,364,663.00 |
| February ........ | 1899 | 8 | 33 | 28 | 13 | 707,973.00 | 1,053,184.45 |
| March ........ | 1899 | 7 | 35 | 30 | 12 | 452,408.00 | 820,598.00 |
| April ........ | 1899 | 5 | 33 | 27 | 11 | 330,152.00 | 628,908.00 |
| May ........ | 1899 | 7 | 36 | 27 | 16 | 406,107.00 | 1,036,468.83 |
| June ........ | 1899 | 10 | 35 | 30 | 15 | 592,845.00 | 804,085.45 |
| July ........ | 1899 | 9 | 35 | 29 | 15 | 642,097.00 | 1,005,016.23 |
| August ........ | 1899 | 4 | 42 | 25 | 21 | 1,592,450.00 | 566,421.44 |
| September ........ | 1899 | 8 | 43 | 26 | 25 | 617,044.97 | 756,890.35 |
| Total ........ | ...... | 110 | 471 | 357 | 224 | 6,991,501.77 | 12,087,971.74 |
| Monthly average ........ | ...... | 9 | 39 | 30 | 19 | 582,625.15 | 1,003,164.33 |
| October ........ | 1899 | 7 | 39 | 26 | 20 | 1,072,923.82 | 1,112,589.00 |
| November ........ | 1899 | 5 | 45 | 29 | 21 | 928,162.15 | 1,496,599.68 |
| December ........ | 1899 | 9 | 41 | 35 | 15 | 1,050,874.00 | 1,540,490.44 |
| January ........ | 1900 | 7 | 41 | 28 | 20 | 681,655.27 | 1,487,553.57 |
| February ........ | 1900 | 7 | 32 | 27 | 12 | 697,000.00 | 1,071,037.57 |
| March ........ | 1900 | 10 | 49 | 37 | 22 | 394,000.00 | 1,627,415.84 |
| April ........ | 1900 | 8 | 45 | 35 | 18 | 181,923.73 | 1,358,396.27 |
| May ........ | 1900 | 11 | 58 | 47 | 22 | 278,000.00 | 1,019,075.00 |
| June ........ | 1900 | 5 | 45 | 37 | 13 | 471,162.00 | 640,356.00 |
| Total ........ | ...... | 69 | 395 | 301 | 163 | 5,705,700.97 | 11,353,513.37 |
| Monthly average ........ | ...... | 8 | 44 | 33 | 18 | 633,966.77 | 1,261,501.48 |

NOTE.—Domestic includes Philippine Islands and Hawaiian Islands. Steamer *Victorian* (registered tonnage, 809 tons), making daily trips between Tacoma and Victoria, British Columbia, not included in any of the above figures.

## X X 14.

## PRELIMINARY EXAMINATION OF KOOTENAI RIVER BETWEEN JENNINGS, MONTANA, AND THE INTERNATIONAL BOUNDARY LINE, WITH A VIEW TO REMOVING OBSTRUCTIONS TO NAVIGATION.

[Printed in House Doc. No. 98, Fifty-sixth Congress, second session.]

Office of the Chief of Engineers,
United States Army,
*Washington, November 20, 1900.*

Sir: I have the honor to submit herewith for transmission to Congress copy of report dated June 21, 1900, by Capt. Harry Taylor, Corps of Engineers, upon preliminary examination authorized by the emergency river and harbor act approved June 6, 1900, of Kootenai River, between Jennings, Mont., and the international boundary line, with a view to removing obstructions to navigation.

Very respectfully, your obedient servant,

John M. Wilson,
*Brig. Gen., Chief of Engineers, U. S. Army.*

Hon. Elihu Root,
*Secretary of War.*

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### REPORT OF CAPT. HARRY TAYLOR, CORPS OF ENGINEERS.

United States Engineer Office,
*Seattle, Wash., June 21, 1900.*

General: I have the honor to submit the following report relative to the preliminary examination of the Kootenai River between Jennings, Mont., and the international boundary line, with a view to removing obstructions to navigation, in compliance with your letter of the 13th instant.

The Kootenai River between Jennings and the international boundary line, a distance of 65 miles, is now fairly good for purposes of navigation. At extreme low water it is obstructed at several places by shoals over which there is not sufficient water for navigation. At the higher stages the only obstruction of any consequence is a canyon about 5 miles above Jennings, where the rock walls of the river approach each other to such an extent as to cause swift and dangerous currents. The act of July 19, 1897, appropriated $5,000 for the improvement of the river by the removal of the obstructions in the canyon above Jennings. Work was carried on under this appropriation until it was exhausted and the project under which it was made was completed. There is at the present time little, if any, settled country between Jennings and the boundary line. During former years the navigation of the river has been for the purpose of bringing out the ores in the country tributary to Fort Steel, British Columbia, and carrying supplies into the country. During the calendar year 1897 the value of the commerce on the river, as obtained from the collector of customs, was $268,266; for the year 1898, $129,562. There was no navigation on the river during the year 1899.

The decline in the navigation of this river was brought about by the building into the country tributary to Fort Steel of a branch of the Canadian Pacific Railway known as the Crow's Nest Pass Branch.

The Kootenai River between Jennings and the boundary line can never be navigated for more than part of the year. At extreme low water there is not sufficient water for boats of any size to navigate, and during the winter there are several months when it will always be closed by ice. In my opinion, there is no commerce on the river at present or immediately prospective which justifies any further expenditure of money.

The above report is submitted from data available in this office. I have never made a personal examination of this stretch of river. In August, 1898, I examined the canyon above Jennings and attempted to make an examination of the river above that point, in order that I might be prepared for such a report as is called for at the present time, should one ever be called for. I left Jennings on a steamer which was bound for Fort Steel, British Columbia. In the 5 miles between Jennings and the canyon the steamer went aground several times on the shoals which occurred almost every mile. It took more than four hours to make the 5 miles to the canyon. The round trip to Fort Steel should have been made in three days, but the captain of the steamer was uncertain whether it would take him three days or three weeks, and as there was no way out of the country except by river, I did not feel under the circumstances like spending the necessary time to make the examination. Owing to the fact that there was at that time no other means of getting in and out of the country, the freight returns were enormously high, and if a few trips could be made by the steamer during high water in the summer the returns were sufficient to justify the running of the boat. But I believe that the competition of the railroad has so changed matters that a boat will never again run on this part of the river. Moreover, the river above the international boundary line, I understand, is of the same character as between Jennings and the boundary line, and any money expended in the improvement of the portion of the river in the United States would be practically wasted, if a like improvement of the river on the other side of the boundary line were not made. At some future day the country between Jennings and the boundary line may become so settled up as to demand the navigation of that section of the river alone, but, in my opinion, it is not demanded at the present time.

Very respectfully, your obedient servant,

HARRY TAYLOR,
*Captain, Corps of Engineers.*

Brig. Gen. JOHN M. WILSON,
*Chief of Engineers, U. S. A.*
(Through the Division Engineer.)

[First indorsement.]

U. S. ENGINEER OFFICE, PACIFIC DIVISION,
*San Francisco, Cal., June 27, 1900.*

Respectfully forwarded to the Chief of Engineers.

The opinion of the district officer, that the navigation of this section of the river is not demanded at the present time, and that any money expended in its improvement would be practically wasted, is, for the reasons stated, concurred in. This section of the river is, in my opinion, unworthy of improvement by the General Government at the present time.

S. M. MANSFIELD,
*Colonel, Corps of Engineers,*
*Division Engineer.*

[Second indorsement.]

OFFICE CHIEF OF ENGINEERS,
U. S. ARMY,
*October 25, 1900.*

Respectfully submitted to the Secretary of War, concurring in the opinion of the local engineer and of the division engineer, that improvement of the locality by the General Government in the manner indicated by the act authorizing the examination is not advisable.

JOHN M. WILSON,
*Brig. Gen., Chief of Engineers,*
*U. S. Army.*

[Third indorsement.]

WAR DEPARTMENT,
*October 27, 1900.*

The views of the local officer and of the division engineer, as concurred in by the Chief of Engineers, are approved.

ELIHU ROOT,
*Secretary of War.*

# APPENDIX Y Y.

## SUPERVISION OF THE HARBOR OF NEW YORK.

### *REPORT OF LIEUT. COMMANDER H. M. HODGES, UNITED STATES NAVY, SUPERVISOR, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

War Department,
Office of the Supervisor of the Harbor of New York,
*New York, July 12, 1901.*

General: I have the honor to submit herewith the following report of the duties and operations of this office for the fiscal year ending June 30, 1901; also an estimate of the amount required for the fiscal year ending June 30, 1903.

The object of this office is to protect the channels of the harbor and tributary waters from injurious and obstructive deposits, and to keep them free from small craft engaged in fishing or dredging for shell fish, or in any way interfering with the safe navigation of those channels by ocean steamships and ships of deep draft; and in order to present a clear statement of the requirements of this office in enforcing the provisions of the acts of Congress under which it operates, it is necessary to present a brief summary of the method adopted for that purpose.

The entire force, consisting of five steam tugs and three launches, is comparatively small when the large territory placed under the jurisdiction of the office is considered; this comprises the entire waters of Long Island Sound, the Hudson River as far as Troy, Staten Island Sound, Newark Bay, and New York Bay and Harbor, together with the tributary waters thereto.

Of the force stated this office has been unable to utilize but five steam tugs and one naphtha launch, the other two launches being laid up, both being old and in need of a thorough overhauling and extensive repairs to make them fairly serviceable. The engines are old and of an obsolete type, the cost of repairs outweighing the cost of new engines; and as the sum available for the running of the entire force may be ample while all the vessels are comparatively new, it is inadequate when they become old and repairs increase. For this reason it was found impracticable to bring these launches out during the current appropriation. Although these little boats are useful in many ways, I do not think a sufficient service is rendered by them to compensate the expense of patching and running, and concur in the opinion as quoted by my predecessor in the annual report for 1899, viz:

> I doubt if their present condition would warrant an expenditure sufficient to put them in permanent efficient condition.

I therefore recommend that they be sold or disposed of in such manner as would prove most advantageous to the Government.

The naphtha launch *Lookout* being in good serviceable condition, having undergone the usual annual overhauling before beginning the work of the season, is stationed in the Kills to watch the waters around Staten Island, the entrance to Newark Bay, and the Passaic and Raritan rivers, and inspecting any points around the harbor where the work of dredging or filling in may be going on and the water is of such nature as would prevent the boats of greater draft approaching near enough for that duty.

Of the five steam tugs the *Vigilant*, *Lamont*, and *Scout* are in good serviceable condition for any duty. The *Argus*, having been overhauled and fitted with a new boiler during the current year to the extent of the appropriation allotted for that purpose, is now in good serviceable condition for patrol duty inside the Narrows, while the *Nimrod*, a very serviceable outside patrol boat, will be made much more efficient for general patrol work when she is overhauled and the search-light plant and steam-steering gear have been installed, as allotted for in the appropriation for the ensuing year.

Four of these vessels are used to insure the deposit of material outside the harbor at the points designated on the permits issued from this office, to prevent the deposit of stone or other ballast by incoming vessels at any point north of Sandy Hook Lightship, and to enforce the provisions of section 2 of the river and harbor act of August 18, 1894, which prohibits small craft to engage in oyster or shell fishing in the channels of the harbor, one of these tugs being stationed outside and another inside the Narrows at all times day and night. The inside patrol boat collects the permits, stamping the same with time and point of collection and noting thereon the condition of the tows passing in and out. The outside patrol boat keeps the tows in view as far as practicable until the designated point of deposit is reached and the material discharged, making daily reports of all tows containing refuse material passing in or out, giving time, point passed, and condition.

In addition, through the courtesy of the Light-House Department, a daily report is made to this office by the master of the Sandy Hook lightship, giving the name and time of all tows disposing of their contents outside that point.

The remaining tug is utilized in patrolling the Hudson and East rivers and Long Island Sound, making daily reports of all scows and dumpers receiving mud or other refuse material along the water front and in special inspections of points where dredging plants or the works of filling in or reclaiming land are in operation. All reports are checked with the permits issued, and as the reports are from different sources and cover the same periods, there can be no collusion. Discrepancies are readily detected and explanation demanded as occasion may require.

Owners of tugboats and dredging plants fully realize the efficiency of the patrol and checking system now in operation, and that the law and regulations of this office can no longer be violated with impunity. All tows containing prohibited material are practically under surveillance from the point of loading until discharged, and illegal deposits of material from tows can not now take place without detection.

There are, however, many violations of the law which are, in some cases, unavoidable, being largely due to defective machinery or refractory material, such as dumpers failing to clear their pockets at the point of deposit, the material gradually discharging on their return trip. But the clause now embraced in all contracts for dredging entered into by the United States and city governments, requiring the material to be disposed of in accordance with law, gives this office the power to deal summarily in such cases. After considerable efforts by this office, demonstrating the mutual advantages to be gained by such a clause, the cooperation of many private parties has been obtained in this direction. As a result, daily reports upon the blank forms furnished by this office for the purpose stated are received from all inspectors on work under public contract and many under private contract. These blanks show the location, name or number, and condition of each dumper loaded or partially loaded during the day, and are checked off with the permits collected by the patrol boats. Discrepancies are noted and investigation immediately instituted, and danger to the channels from illegal deposits in transit is therefore correspondingly reduced, as all material reported loaded on dumpers and failing to pass out is checked, and the department or private party furnishing the reports is immediately notified and a suggestion given that payment be withheld until satisfactory evidence is furnished this office by the contractor that the material so checked has been disposed of in accordance with law.

Dumpers failing to clear at the proper point of deposit and returning through the Narrows with pockets loaded or partially loaded are inspected at the Narrows by the patrol boat on inside duty, and their condition carefully noted on the permits, and should such dumpers fail to be returned to the dredge in the condition noted, to be there measured and the contents deducted by the inspector, the material thus returning is checked by this office and the Department or private party advised of the facts, with a suggestion that payment therefor be not made until the contractors furnish satisfactory evidence or explanation as to the final disposition of the material so returned, thus removing entirely any advantage which may accrue to the contractors by the escape of material in transit.

This action is most salutary in its effect, as contractors find it materially to their interest to keep their plants in efficient and serviceable condition rather than suffer the deductions likely to result from leaky doors or defective machinery.

The following deductions have been made on contracts for material escaping from defective dumpers from July 1, 1900, to June 30, 1901:

| | Cubic yards. |
|---|---|
| United States Engineer Department | 1,975 |
| New York City department of docks and ferries | 1,994 |
| New York City department of bridges | 1,346 |
| Private contracts | 2,445 |
| Total | 7,760 |

at an estimated average of 20 cents per cubic yard, amounting to $1,552.

Under these same contracts 46 pocket loads (averaging 150 cubic yards each, or a total of 6,900 cubic yards) were noted by the inside patrol boat and kept under surveillance until they were returned to the original point of loading and there deducted before reloading.

In all cases where material fails to clear the dumpers at the proper point of deposit the patrol boat on outside duty is required to see that the doors are wound up as tightly as possible before reentering the harbor, and the inside patrol boat is required to keep such tows under surveillance until their destination is reached, whenever she can be spared off station. But even after all these precautions, more or less of the material thus returning escapes in transit and finds its way to the channels. This is largely due to the present type of vessels employed, as when the doors are once opened it is practically impossible to absolutely close them tight again, and it has been found impracticable to keep them outside the harbor in heavy weather until they clear. The only remedy for this evil seems to be a strict enforcement of the penalty of nonpayment, which will eventually result in an improved class of vessels employed in the work. These violations of the law, which individually amount to but little, in the aggregate become a serious menace to the channels of the harbor and emphasize the absolute necessity of a constant and efficient patrol, and demonstrate the economy of the United States in furnishing proper facilities for the enforcement of the law, as previous to the establishment of this office the channels were entirely at the mercy of unscrupulous contractors who disposed of the refuse material at any point within the harbor when opportunity offered, with an utter disregard for the maritime interest of the port, notwithstanding the fact that the depositing of obstructive and injurious material in these tidal waters has been since 1857 illegal under the laws of the State of New York, and also under the laws of the State of New Jersey since 1882; these laws proving ineffective owing chiefly to a divided responsibility.

The probable violation of the law involved in the movement of vast quantities of material about the harbor and adjacent waters, averaging 12,000,000 cubic yards yearly, besides many cubic yards of ashes, sweepings, etc., deposited on shore from ferryboats, steamships, and towboats, would speedily damage the channels and approaches of the harbor much more than the cost and maintenance of an efficient patrol, the advantages of which can not be overestimated.

In accordance with the settled policy of this office to gradually extend the limits within which the deposit of refuse material must not be made, and by increasing vigilance on the part of the entire force, compelling a strict compliance with the law and regulations governing the deposit of waste material, to open a cheaper and certainly more desirable method of disposition than at the mouth of the harbor, my predecessor issued the following circular:

WAR DEPARTMENT,
OFFICE OF THE SUPERVISOR OF THE HARBOR OF NEW YORK,
*New York, February 23, 1900.*

[Circular notice.]

The location of the present point of deposit for refuse from New York having, through the immense amount of stuff deposited there, become so much shoaled that but a limited further amount of material can be deposited in that locality, it becomes necessary to change such point of deposit; and notice is hereby given that on and after September 1, 1900, the point of deposit for all refuse material proceeding to sea under the cognizance of this office will be at a point not less than one-half mile to the southward and eastward of Sandy Hook light-ship, the usual regulations as to the time of deposit of floatable material continuing as before.

Respectfully,

J. C. FREMONT,
*Lieut. Comdr., U. S. N., Supervisor.*

This order became operative on the date specified and has given the most satisfactory results, amply demonstrating the policy of this office, to the great advantage of the Government, that waste material may be safely deposited during all seasons of the year, and in almost any kind of weather, at the point stated. This extension of limit at first met with sharp opposition, especially from those owning dumpers in poor condition, but a rigid enforcement of the order brought about a general acceptance, and has led to its indorsement by many formerly opposed to it.

The change of the location of the dumping ground to a point about 7½ miles farther out at sea than the old dumping ground increased the towage on a round trip about 15 miles, and the increased danger from rough weather which is likely to be experienced so far out necessitates the employment of better vessels for the purpose of transporting the material, and where formerly it was the custom of the tugs to take from four to six dumpers in tow at one time it now becomes impracticable to handle more than one, except in the most favorable weather; but I see no reason why the trip should not be made with perfect safety, provided the proper type of vessel is employed for the purpose.

As a rule, the employees of those engaged in this business resort to every subterfuge to evade the law, and there are good reasons for believing that the employers have not infrequently encouraged the commission of illegal practices, there being abundant reasons for believing that dumpers were frequently relieved of part of their loads within the harbor in order to render towing easier, and in many instances vessels unseaworthy and not furnished with the proper facilities for protection against heavy weather were employed in this work; but several cases of illegal dumping involving these questions being promptly referred to the United States district attorney for prosecution of the parties liable will, if the position of this office is sustained by the courts, put an end to cases of like nature and will result in the employment of thoroughly seaworthy and modern types of vessels for such work. In evidence of which, attention is directed to the types of vessels now employed in the works going on under the Government, namely, the large, modern, steam, seagoing dredges operating in the Main and Ambrose channels, and the covered dumpers used on the work going on in Bay Ridge channel. These dumpers have a carrying capacity of nearly 2,000 cubic yards, have considerable freeboard, and are fitted with steam sufficient to operate pumps, anchors, etc.; and in case of failure to clear at the designated point of deposit, these pumps may be utilized in washing out the pockets; and although large and unwieldy, they can carry their loads with perfect safety to sea in almost any weather.

It has been the aim of this office to encourage the utilization of all waste material as far as possible for filling in and reclaiming land, and it is satisfactory to have to state that large quantities of the city waste and cellar dirt are being utilized for filling in the Jersey flats at Greenville for the Pennsylvania Railroad Company and at other points in the harbor behind properly constructed bulkheads, and much of the material excavated for the city tunnel is also being disposed of in this manner.

One of the most serious problems to be met by this office in the final disposition of material in the manner stated is due to imperfect bulkheading and careless handling, much of the lighter material being permitted to escape from the openings in the bulkheads when loaded scows are admitted, necessitating almost constant surveillance by this office and calling from me sharp communications to the parties interested, threatening to revoke their permits. This action generally leads to effective measures being immediately adopted to prevent the escape of material.

The entire garbage from the city is now disposed of by reduction on Barren Island, 239,820 cubic yards having been disposed of in this manner during the past fiscal year, permits being issued by this office in accordance with law for the transportation of such material over the waters of the harbor, an average of 25 miles, and a strict supervision is exercised by the patrol boats on duty to prevent loss of material in transit due to improper trimming or careless handling.

In consideration of the large amount of material which has been disposed of on shore for filling in and reclaiming land in comparison with former years, the great improvement and protection to the channels must be evident, although the progress has been so slow that probably only those closely interested would notice it. Any layman, however, can not fail to notice the very marked improvement in the condition of the waters of the lower bay and the beaches of Long Island and New Jersey.

The final disposition of the refuse collected by the street cleaning department of New York City is one of the most difficult problems to solve, and relief will not be had from the deposit of this most objectionable material at the mouth of the harbor until the city is compelled to separate the material collected into different classes and dispose of it accordingly.

That part of the city's waste commonly termed "street sweepings" is much more offensive and injurious than the name implies, as it consists not only of street sweepings, but a collection of rubbish embracing old barrels, laths, bedding and other offensive floatable material, which even if deposited at the mouth of the harbor many miles farther from shore than the regulations at present require, more or less of it would find its way back to the channels and beaches with favorable wind and tide; and until the city is compelled to dispose of this rubbish by cremation or otherwise it will be found impracticable to utilize the "street sweepings" for filling-in purposes; and for this reason, although much of it has been used for the purpose, it has been refused after trial by many parties desiring to reclaim and fill in land; and as the city must have some outlet at the present time for this vast amount of waste material, there is no resource but depositing it as far out at sea as is practicable and under such conditions of tide as will prevent as much as possible its return: and as this office has not the power to prevent the deposit of such offensive and injurious material at sea, the following communication was addressed to the commissioner of street cleaning, New York City, clearly defining the position of this office in regard to the matter, and with the hope that some action would be taken by the city authorities to furnish that department with sufficient funds to carry out the suggestions contained therein and fully concurred in by the commissioner as per letter of June 25th, 1901, a copy of which is submitted herewith:

WAR DEPARTMENT,
OFFICE OF THE SUPERVISOR OF THE HARBOR OF NEW YORK,
*New York City, June 24, 1901.*

SIR: I desire to officially place on record an unqualified protest by this office against the practice of depositing the refuse of this city at the mouth of the harbor and to the present type of vessels employed by your department for that purpose. I refer to what are commonly termed "deck scows," which are entirely unsuitable for the purpose, and to those known as "Barney dumpers," which, although better adapted for going to sea, have become absolutely unseaworthy from long idleness and neglect; both classes of vessels being, in my opinion, not only dangerous to life and property, but extremely hazardous to the channels of the harbor, in the improvement of which the United States Government has spent and is spending such vast sums.

On the 21st instant this office was informed over the telephone by the deputy commissioner that the city's waste was being congested at the city dumps, and that some outlet must be had for it immediately; and believing that the health of the community would be endangered if this waste material were permitted to remain there for any length of time, permits were issued by this office for its final disposition at sea; but in issuing these permits it is to be distinctly understood that this office does not in any way indorse this method of disposition, and that the city is, or ought to be, held strictly responsible for loss of life or property and damage to the channels resulting from the employment of unsuitable or unseaworthy vessels in the transportation of its material.

This office is fully cognizant of the difficulties of the problem facing your department in regard to a sanitary and effective method of final disposition, especially so in relation to the proper separation and classification of its waste; but this is no reason why the channels of the harbor of the chief commercial city of the country should be in any way jeopardized by the failure of the city authorities to furnish suitable means or facilities for the final disposition of its waste. If there is no other outlet for this waste at the present time than by depositing it at the mouth of the harbor, I am of the opinion that it is not sufficient for the city to merely employ contractors to perform the work, but to adopt such measures as will ensure the material being deposited in accordance with the terms of the permit issued by this office, and to see to it beyond peradventure that the regulations of the statutes are complied with.

The city ought to have equally as much interest in keeping the channels clear as in keeping the streets, and I see no reason why its waste, if properly separated and classified, eliminating all offensive matter, may not be successfully utilized in reclaiming land and filling behind properly constructed bulkheads. The question of cost of separation or handling ought not to be considered.

Respectfully,

H. M. HODGES,
*Lieut. Comdr., U. S. Navy, Supervisor.*

P. E. NAGLE, Esq.,
*Commissioner, Department of Street Cleaning, New York City.*

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DEPARTMENT OF STREET CLEANING,
*New York City, June 25, 1901.*

SIR: I am in receipt of yours of the 24th instant, and can only say that I fully concur in all that your letter contains.

Our land dumps have recently and without warning been very much curtailed, but the accumulation of the city's refuse continues just the same, and the department has been put to serious stress on account of there being no facilities for places of discharge.

It is a source of deep regret to me that I have had to resort to and resume sea dumping at all, and especially at this season of the year, but it was the only outlet for the material that it was our duty to dispose of.

The barges that you complain of in your telephone communication to-day are those that were loaded before our land dumping facilities were cut off, or I should not now attempt to have them discharged at sea.

You know, of course, that the department of street cleaning must live within its appropriation, and as our expenditure for final disposition is and must necessarily continue to be for some time a matter of uncertain quantity, our appropriation generally falls short, making it necessary to transfer some other accounts to complete its charges.

I concur with you in that the city should be equally interested in keeping the channels clear as in keeping the streets clean, and I also believe that the material should be properly separated and classified, eliminating all offensive matter, so that it could be properly used in fill, whatever the cost may be, but, as I before stated, we are only limited to the amount of the appropriation allotted to the department's use.

I shall make every endeavor to conform to the rules and regulations which are required by your office and the United States law, but if you can consistently strain a point by helping us out of the present condition I shall appreciate the favor very highly.

Very truly, yours,

P. E. NAGLE, *Commissioner.*

Lieut. Commander H. M. HODGES, *U. S. N.*,
*Supervisor of the Harbor.*

I am, however, strongly of the opinion that absolute protection to the channels can not be obtained until some law has been passed absolutely prohibiting the deposit of any waste material at the mouth of the harbor.

In this connection I desire, however, to state that considerable effort has been made by the present commissioner of street cleaning of the city of New York to dispose of the city's waste in a less objectionable manner than by dumping it at the mouth of the harbor, and he succeeded so far that none of it was deposited there during the months of August, September, October, and part of November, 1900, May and part of June of the present year, during which periods the entire city refuse was disposed of for filling in on shore, as previously stated, and this good work could have been continued had not objection been made to the class of material furnished, to which I have already referred.

Considerable effort is being directed by this office in forcing an improved method of handling the city's waste from carts to scows at the city and private dumps along the shore, where much is permitted to escape into the water for want of proper facilities for handling; yet the percentage thus escaping is small indeed compared with former years.

As the facilities of this office have increased so has the field expanded, and to maintain the work accomplished and the great amount of work yet to be done will tax the available force to its utmost limit, in order that the channels—in the improvement of which such vast sums have been and are being expended by the Government—may be protected and effectively patrolled; and in view of the fact that it is economy to keep the patrol vessels in the highest state of efficiency I earnestly recommend an increase of the appropriation for the maintenance of the 5 steam tugs of $1,660, as the amount heretofore estimated as necessary for this purpose has been too closely drawn, allowing only for the actual running expenses of the vessels, leaving little for incidental and unforeseen repairs, causing a running down of the vessels and marring their efficiency. This state of affairs was most marked during the past year when, owing to the strike in the coal regions, coal in New York attained such a high market figure to make it almost prohibitory, and as a consequence many important repairs to vessels had to be patched, and in some instances the vessels were laid up in order to gain sufficient funds to meet the repairs and eke out a crippled existence to the close of the fiscal year.

I feel that the best efforts of this office during the coming year must be directed against the employment of inferior or unseaworthy vessels upon the work of transporting waste material to sea. This problem will be solved by deductions for material not deposited in accordance with contracts in all public work, but in the cases of private contract the matter is much more difficult. In some instances the parties for whom the work is being done ignore the suggestion offered by this office to that effect, claiming, I believe, that as they had been relieved of the material they could not legally make such deductions. The only course then open to this office is to enjoin the offending contractor from moving his scows or dumpers until the same has been in each case inspected by this office before a permit is issued, as required by law. This action would entail such delay in the operation of his plant as would speedily bring him to terms, and would prove much more effective and less expensive than referring such cases to the United States district attorney for prosecution.

The following is a synopsis of the most important cases of illegal dumping which have been referred to the United States district attorney for the southern district of New York, with a recommendation by this office that legal proceedings be instituted against the parties liable; and in order that a clear statement of the questions of law therein involved may be presented, and the fixing of responsibility may be more easily comprehended, the opinions and decisions rendered are given in full.

In this connection I desire to place on record my appreciation of the prompt action on the part of that office in bringing the cases so reported to a speedy trial and of the able and efficient manner in which these cases were handled by the prosecution.

### CASE AGAINST TUG GEO. L. GARLICK, AS EMBODIED IN THE PRECEDING ANNUAL REPORT, AND STILL PENDING.

In this case the tug *Geo. L. Garlick*, in charge of F. Romard as master, with tow of two dumpers, Nos. 9 and 17, passed Coney Island Point bound out about 11.15 a. m., April 8, 1898. The patrol boat followed, clearing the point about 11.50 a. m., and found the *Garlick* about three-quarters of a mile southeast from iron pier bound in, with all dumpers light.

As this illegal deposit was not made in the presence of the deputy inspectors on the patrol boat direct evidence was impossible, but the inference seemed so conclusive that the case was referred to the United States district attorney for his action.

The following is a synopsis:

May 10, 1898: Defendants pleaded not guilty with leave to withdraw plea on the 16th May.

May 16, 1898: Defendants demur to the indictment.

August 5, 1898: Judge Thomas files opinion overruling demurrer.

August 12, 1898: Judge Thomas signs order overruling demurrer.

October 13, 1898: The defendants renew plea of not guilty. The demurrer was based upon the alleged unconstitutionality of the act of Congress approved June 29, 1888, and the amendment, and not upon the form or wording of the indictment.

June 15, 1900: The case is still pending for trial.

June 30, 1901: The case is still pending for trial.

### CASE AGAINST THE TUG F. N. BROWN, AS EMBODIED IN THE PRECEDING ANNUAL REPORT, WITH OPINION AND DECISION ADDED, AND THE CASE CLOSED BY PAYMENT OF THE FINE.

This tug, in charge of Albert Randall, master, passed Gravesend Bay bound out at 7 p. m., August 29, 1899, with dumper No. 39 fully loaded with cellar dirt, and passed Fort Lafayette bound in at 12.55 a. m., August 30, 1899, having after pocket one-half loaded, wound up as tightly as possible. The patrol boat kept this tow under surveillance until it reached its destination at the foot of Forty-first street, East River, where it arrived about 3.30 a. m. of that date with the pocket referred to entirely empty.

As this seemed to me a clear case of violation of law, I conferred with the office of the United States district attorney and agreed that the case should be brought to trial, in order that a decision in such cases might be obtained for the information and guidance of this office in future.

The following is a synopsis of the case:

December 7, 1899: Indictment filed.
January 10, 1900: Trial commenced.
January 11, 1900: Defendants convicted.
January 23, 1900: Each defendant sentenced to pay a fine of $250. Motion for new trial and in arrest of judgment. Motions denied. Stay of thirty days in which to serve case and exceptions on appeal. Bail given pending appeal. The appeal will be argued in the circuit court of appeals at October term, 1900.
December 11, 1900: Appeal submitted.
January 4, 1901: Decided.

### COPY OF OPINION AND DECISION.

United States circuit court of appeals for the second circuit.

No. 32—October term, 1900.

Submitted December 11, 1900. Decided January 4, 1901.

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| ALBERT RANDALL AND CORNELIUS NELSON, PLAINTIFFS in error, *v.* THE UNITED STATES, DEFENDANT IN ERROR. | Error to the circuit court of the United States for the southern district of New York. |

Before Judges Wallace, Lacombe, and Shipman.

This is a writ of error from a judgment of the circuit court for the southern district of New York, rendered upon a verdict of guilty upon an indictment against the defendants for a joint violation of section 3 of the act of August 17, 1894, to prevent injurious deposits within the harbor of New York City. (28 Stats., 338.)

The statute, after providing that the owner or master of the dumping scows or boats must obtain a permit defining the limits within which the discharge of scows may be made, provides as follows:

"And any deviation from such dumping or discharging place specified in such permit shall be a misdemeanor, and the owner or master or person acting in the capacity of master of any scows or boats dumping or discharging such forbidden matter in any place other than that specified in such permit shall be liable to punishment therefor as provided in section 1 of said act of June 29, 1888; and the owner and master or person acting in the capacity of master of any tug or towboat towing such scows or boats shall be liable to equal punishment with the owner and master or person acting in the capacity of master of the scows or boats; and, further, every scowman or other employee on board of both scows and towboats shall be deemed to have knowledge of the place of dumping specified in such permit, and the owner and master or person acting in the capacity of master shall be liable to punishment as aforesaid for any unlawful dumping, within the meaning of this act or of the said act of June 29, 1888, which may be caused by the negligence or ignorance of such scowman or other employee; and, further, neither defect in machinery nor avoidable accident to scows or towboats, nor unfavorable weather, nor improper handling or moving of scows or boats of any kind whatsoever, shall operate to release the owners and masters and employees of scows and towboats from the penalties hereinbefore mentioned."

In the act of June 29, 1888, the offense is made a misdemeanor, punishable by fine or imprisonment, or both. (25 Stats., 209.) The following facts appeared upon the trial to the jury:

"On August 29, 1899, the steamer *F. N. Brown*, of which the defendant, Randall, was master, received a permit to pass with *Dumper 39*, of which Nelson, the other defendant, was master, containing cellar dirt, from Fortieth street to the south and east of Sandy Hook light-ship and deposit the dirt in not less than 15 fathoms of water. The tug and tow left Fortieth street on the evening of August 29, reached the dumping ground about 10 o'clock p. m.; Randall gave the prescribed signal, circled around the light-ship, and, assuming or believing that the scow had been emptied, started upon the return trip. The dumper contained four pockets, three of which were emptied, but about half of the contents of the fourth pocket "stuck," or adhered together, and were not discharged. Nelson probably knew this fact at the light-ship, but did not attempt to inform Randall; closed the doors of the pocket as well as he could and intended it to be taken back with that part of the load to Fortieth street, where it would be transferred to another pocket or removed. The sea was rough, with a large ground swell from the southeast, and the night was dark. In still weather means are used to compel the dirt to leave the pocket. It is sometimes washed out with a hose, and sometimes it is started by the tug's butting against the scow. On the night in question, Nelson and Randall testified that any attempt would have been dangerous by reason of the weather, or have been futile. When tug and tow passed Fort Lafayette, at 12° 55′ on the morning of August 3, the mate of the Government patrol vessel saw that the after pocket of the scow listed, boarded her, and found that it was partially filled with dirt. The tug, at Bay Ridge, changed the position of the scow so that thereafter the loaded end was forward, and upon the return trip the dirt oozed out until, when she reached Fortieth street, about 3.30 a. m., she was either empty, or had on board about twenty carloads. The entire quantity had oozed out before morning."

*Per curiam.*—The two points upon which the counsel for the plaintiffs in error relies are that the stress of weather, which prevented attempts at the light-ship to empty the pocket, created an unavoidable accident which required the court to grant a motion to direct a verdict for the defendants, and that if the terms of the statute require a conviction, although perils of the sea compel a deviation from the dumping ground, the statute is so unjust in its character as to violate the spirit of the Constitution.

Such a construction was not given to the statute by the circuit court.

It charged the jury, in substance, that the necessities of commerce required the protection and preservation of the harbor of the chief commercial city of the country, and that an act to protect the waters of the harbor for the purposes of navigation was within the constitutional power of Congress.

As experience had shown the necessity of a rigid observance of prohibitory measures against the obstruction of the harbor, there was occasion for an act which would cast rigid responsibilities upon persons who permitted a violation of the statute, but that the act in question did not mean that there was no excuse in any event for a deviation from the specified dumping ground. The act required the captain of the tug, who was in the general charge of both tug and tow, to exercise the highest diligence to prevent a deviation from the dumping place specified in the permit and therefore he could not set up, in discharge of this obligation, defects in machinery, because the machinery could have been tested before the voyage commenced; or avoidable accidents; or mere unfavorable weather, because the expedition need not have been entered upon in such weather; or lack of seamanship.

The same duty of diligence was imposed upon the captain of the scow to see that the load was discharged at the proper time and place; and the question of fact was submitted to the jury as to each defendant, whether he did on the night in question all that diligence required.

Upon the precise point in the case, the alleged combination of an accident and stress of weather, which prevented the use of means to overcome the accident, the court charged that if the master got into trouble and there was such unfavorable weather that he could not correct the trouble, that would be a question for the consideration of the jury.

The court further charged, upon the general subject of neglect or inability to discharge the load at the specified place and upon the particular reason which was presented by the defendants for a return to the harbor with a dumper which had not been emptied, as follows:

"Whether holding these men to a rigid accountability, which means that they should use that high degree of care in doing this work that its importance required, has either of them done some act which was negligent under the circumstances, or omitted to do some act the omission of which was negligent under the circumstances? There has been some suggestion here with reference to the unfavorableness of the weather. I suppose you would have to give a common-sense interpretation to that expression. A man can not come in and say that he did not do this because the weather was not favorable for doing it. The question is whether, under all the circumstances of the case, the weather was so unfavorable that * * * life and property would be jeopardized in attempting to maneuver out in the water. You have heard what has been said by the captain of the tug and by others as to the condition of the water. It is for you to determine, under all the circumstances of the case, whether, for instance, it was unsafe for them to have remained out there and tried to wash out this pocket, or to have done any of these other acts which sometimes are done for the purpose of bringing about the complete emptying of the scow."

That there was a deviation and that all the cargo was not dumped at the specified place was admitted, and the question before the jury was whether either of the two defendants was responsible for the deviation by omitting to do what diligence required him to do in order to avoid such a result. The question of the violation of the statute by each defendant was presented to the jury, and there was no suggestion that the violation by one was a violation by the other, and that, therefore, both could be found guilty for the act of one alone. The construction of that part of the statute which declares that the master shall be liable for any unlawful dumping which may be caused by the ignorance of the scow man or other employee was not before the court.

We see no reason to conclude that the questions of fact in regard to a violation of the statute should have been taken from the jury, or that the construction which was given to the statute violated the principles of natural justice.

The judgment of the circuit court is affirmed.

Peter S. Carter, for the plaintiffs in error.

William S. Ball, for the United States.

## CASE AGAINST THE TUG EMMA K. ROSS, AS EMBODIED IN THE PRECEDING ANNUAL REPORT, WITH OPINION AND DECISION ADDED, AND THE CASE CLOSED BY PAYMENT OF THE FINE.

In this case the tug, in charge of Frank Jaycox, master, was proceeding to sea about 5.30 a. m. of March 7, 1900, with dumpers Nos. S10 and S34, fully loaded with mud, and when between buoys Nos. 4 and 2, East channel, the contents of both dumpers were discharged.

This case was fully investigated by me, the master of the tug claiming that the scow men mistook his signal to lengthen towlines for his signal to dump. I found the scow men employed on these dumpers unable to speak sufficient English to be understood. I deemed it a proper case to be decided by the courts, and accordingly referred the papers to the United States district attorney with a request for prompt action, as I personally deemed the employers negligent and culpable in employing incompetent men in charge of scows.

The following is a synopsis of the case:

April 19, 1900: Grand jury filed bill.

May 9, 1900: Trial commenced.

May 21, 1900: Trial finished. Defendants convicted. Jaycox sentenced to pay $250 fine. Wold and Kunsen sentenced to thirty days' imprisonment each. Stay of thirty days for appeal.

This appeal will be argued at October term, 1900, of the circuit court of appeals.

February 8, 1901: Appeal submitted.

April 3, 1901: Decided.

### COPY OF OPINION AND DECISION.

United States circuit court of appeals for the second circuit.

No. 95. October term, 1900.

Submitted February 8, 1901. Decided April 3, 1901.

FRANK JAYCOX ET AL., PLAINTIFFS IN ERROR, *v.* THE UNITED STATES, DEFENDANT IN ERROR. } Error to the circuit court of the United States for the southern district of New York.

Before Judges Wallace, Lacombe, and Shipman.

Wallace, *circuit judge:* The plaintiffs in error were convicted on an indictment charging them with the violation of the statute of Congress of June 29, 1888, as subsequently amended (1 Supp. U. S. Rev. Stat., 594; 2 Supp. U. S. Rev. Stat., 249), entitled "An act to prevent obstructive and injurious deposits within the harbor and adjacent waters of New York City by dumping or otherwise, and to punish and prevent the offenses." No question is made as to the sufficiency of the indictment, but the assignments of error challenge some of the rulings of the court upon the trial.

The statute (sec. 1) forbids the discharging or the "depositing, by any process or in any manner," of refuse, etc., in the tidal waters of the harbor of New York, or its adjacent or tributary waters, or in those of Long Island Sound, "within the limits which shall be prescribed by the supervisor of the harbor," and makes the act a misdemeanor. It declares (sec. 2) that "any and every master and engineer, or person or persons acting in such capacities respectively, on board of every boat or vessel, who shall knowingly engage in towing any scow, boat, or vessel loaded with any such prohibited matter to any point or place of deposit or discharge" in the waters mentioned "elsewhere than within the limits defined and permitted by the supervisor of the harbor" shall be deemed guilty of a violation of the act, and be punishable as therein specified. It declares (sec. 3 as amended) that upon receiving on board of any scows or boats such prohibited matter it shall be the duty of the owner or master, or person acting in such capacity on board of scows or boats, before proceeding to take or tow the same to the place of deposit, to apply for and obtain from the supervisor of the harbor a permit defining the precise limits within which the discharge of such scows or boats may be made. The section further provides as follows: "And any deviation from such dumping or discharging place specified in such permit shall be a misdemeanor, and the owner and master, or person acting in the capacity of master, of any scows or boats dumping or discharging such forbidden matter in any place other than that specified in such permit shall be liable to punishment therefor as provided in section 1 of the said act of June 29, 1888; and the owner and master, or person acting in the capacity of master, of any tug or towboat towing such scows or boats shall be liable to equal punishment with the owner and master, or person acting in the capacity of master, of the scows or boats; and further, every scowman or other employee on board of both scows and towboats shall be deemed to have knowledge of the place of dumping specified in such permit, and the owners and masters, or persons acting in the capacity of masters, shall be liable to punishment, as aforesaid, for any unlawful dumping, within the meaning of this act or of the said act of June 29, 1888, which may be caused by the negligence or ignorance of such scowman or other employee; and further, neither defect in machinery nor avoidable accidents to scows or towboats, nor unfavorable weather, nor improper handling or moving of scows or boats of any kind whatsoever shall operate to release the owners and masters and employees of scows and towboats from the penalties hereinbefore mentioned."

It appeared upon the trial that on a trip to the dumping grounds on the night of March 6, 1900, Jaycox being the master of the towboat, Wold, the master of Scow No. 10, and Kunsen, the master of Scow No. 34, the two scows dumped their refuse in the harbor before reaching the dumping grounds specified in their permits. There had been no deviation upon the voyage. Jaycox had instructed the masters of the scows that when the dumping ground was reached the tug would give the scows a dumping signal of four whistles. The masters of the scows mistook a different signal given by the towboat, a signal of three whistles which had been agreed upon as indicating a given maneuver as a four-whistle signal for dumping, and it was in consequence of this mistake that the dumping took place within the prohibited locality. At the time Jaycox himself had gone to bed, leaving the mate of the towboat in charge of her navigation.

The assignments of error present among others the question whether Jaycox was guilty of offense. The third section of the statute prescribes that the master of the towboat, or person acting in the capacity of master, shall be liable to equal punishment "with the master of the scows for dumping prohibited matter in any place other than that specified in the permit." Jaycox was master of the towboat, and the fact that he was asleep and therefore not actively managing her navigation at the time when the forbidden act was committed can not relieve him in view of the explicit language of the statute. The mate was not even acting in the capacity of master. He was at the time subject to the commands of Jaycox.

It was urged in behalf of Jaycox, as well as in behalf of the other defendants, that the statute is beyond the constitutional power of Congress if it is to be construed as making a person who is innocent of criminal intent criminally liable for the act of another. We are aware of no authority supporting the proposition that the presence of a criminal intent is an essential element of a statutory offense. In the words of Chief Justice Beasley (Halstead *v.* State, 41 N. J., 552, 592): "Nothing in law is more incontestable than that, with respect to statutory offenses, the maxim that crime proceeds from a criminal mind does not universally apply. The cases are almost without number which vouch for this." See Reg. *v.* Tolson (23 Q. B. Div., 168); Beckham *v.* Nacke (56 Mo., 546); Commonwealth *v.* Raymond (97 Mass., 567); State *v.* Steamboat Co. (13 Md., 181); Commonwealth *v.* Finnigan (124 Mass., 324). The statute does not make any person criminally liable for an act committed without his participation. The participation of the master of the towboat and the masters of the scows is found in the circumstance that they are assisting in the general undertaking in the course of which the forbidden act is done. Neither one of them is under any obligation to engage in such an enterprise, and if he chooses to engage in it he does so at the peril of incurring criminal responsibility if it is not pursued lawfully; and no principle of natural justice is violated by a statute which makes him responsible for the conduct of his coadjutor. The statute in effect says to the masters of the vessels, if you wish to assist in dumping refuse you must do so at the risk of criminal responsibility for the acts of your associates as well as for your own. The statute is a severe one, but this does not militate against its validity. Its stringency may be necessary to compel all those who engage in dumping refuse within the waters specified to see to it beyond peradventure that the regulations of the statute are complied with.

In People *v.* Roby (52 Mich., 577), under a statute requiring all bars at which liquor was kept for sale to be closed on Sundays, the proprietor of a hotel was convicted upon proof that his clerk in his absence sold one glass of liquor at the bar, without any evidence of his complicity in the opening of the bar on that day, or that he expected or desired that it should be opened; and the conviction was upheld. Cooley, C. J., observed: "Many statutes which are in the nature of police regulations, as this is, impose criminal penalties irrespective of any intent to violate them, the purpose being to require a degree of diligence for the protection of the public which shall render violation impossible." In Noecker *v.* People (91 Ill., 494), the proprietor of a liquor store was convicted for a sale made by his agent in violation of his instructions. Such adjudications illustrate the constitutional validity of statutes subjecting persons to criminal responsibility for the acts of others in the same general employment, in the absence of participation in the particular act and in the absence of guilty intent.

Error is assigned of the refusal of the court to dismiss the indictment upon the motion of the defendants. The motion was to dismiss the indictment "as to each defendant, upon the ground that they are improperly included in the indictment," and was made before any evidence had been introduced. It is the apparent meaning of the statute that the unlawful act of the scow men shall be regarded as the act of the master of the towboat if committed upon the dumping voyage, and consequently as one and the same offense. Whether the act of one scow man is to be regarded as the act of another when both do not participate in committing it, is a more doubtful question, and we are not called upon in the present case to decide it. The rule of law is that when an offense is such that several may join in it, all or any number of those who do join in it may be indicted, either jointly or separately. But where the offense is such as not to permit of participation or agency several offenders can not be enjoined; as for perjury or for seditious or blasphemous words, or the like; because such offenses are in their nature several. Even where the indictment joins several defendants the charge is several as well as joint, and judgment can be rendered against one or more notwithstanding the others are acquitted. The indictment upon its face alleged that all the defendants aided and abetted in the act of dumping. If the averments were true, as the act was a misdemeanor, all were principals. The indictment consequently well charged a joint offense, and it was not error to deny the motion. If the motion had been based upon the evidence introduced, the Government might have been put to an election as to which one of the two scow men it would dismiss the indictment. United States *vs.* McDonald (3 Dill., 544). If the statute should be construed as not treating the act of one scow man as that of the other, nevertheless the evidence justified the conviction of the towboat master and one of the scow men.

Error is assigned of the instruction of the trial judge to the jury to the effect that the failure of the scow men to observe the signals of the towboat did not exonerate any of the defendants from criminal responsibility. The concluding clause of section 3, "neither defect in machinery, nor avoidable accidents to scows or towboats, nor unfavorable weather, nor improper handling or moving of scows or boats of any kind whatsoever, shall operate to release the owners and masters," by implication absolves the masters of towboats and scows from criminal responsibility for violations of the statute caused by unavoidable accidents, but not from those caused by negligence or ignorance of the employees of the scows. The instruction to the jury was correct, and the trial judge properly refused the various instructions requested in behalf of the defendants in qualification thereof.

We find no error in the record, and the judgment of conviction is affirmed.

*Edward G. Benedict*, for the plaintiffs in error.

*William S. Ball*, for the defendant in error.

## CASE AGAINST TUG "JOHN FLEMING," AS EMBODIED IN THE PRECEDING ANNUAL REPORT, WITH THE PRESENT STATUS THEREOF ADDED.

In this case the tug, in charge of Eric Erickson, acting master, proceeded to sea, having in tow dumper No. E25, fully loaded with cellar dirt, passing the mud buoy bound for the light-ship about 3.25 p. m.

of May 19, 1900. She was overhauled by the patrol boat just inside the light-ship, and the dumper was found to have only one pocket loaded, three pockets evidently having been lost between the point and the light-ship. On investigation I found that the scow man claimed the scow was leaking, and the master of the tug claimed he could not control the actions of the scow man. The weather at the time being very severe, with heavy sea and high wind, showing poor judgment on the part of the master of the tow in proceeding to sea in such weather and expecting to make the designated point of deposit with his tow loaded, I therefore determined to present the case to the United States district attorney, who expressed his opinion that the case should be prosecuted criminally. The papers in the case were therefore turned over to the district attorney, with the result that the acting master of the *Fleming*, Eric Erickson, and the scow man, Patrick F. Murray, were held for trial.

The following is a synopsis of the case:

June 15, 1900: Indictment ordered by grand jury and will be filed June 19, 1900.
June 19, 1900: Indictment filed; plea of not guilty.
June 30, 1901: Case pending.

### CASE AGAINST TUG "W. J. SEWALL."

In this case the tug *W. J. Sewall*, in charge of Frealon Briggs, master, passed out with two scows loaded with mud, Nos. 13A and 16A, on the afternoon of July 5, 1900. When about one-fourth of a mile east of buoy No. 2 in the East Channel, at about 10 p. m., the contents of these scows were discharged, the scow men claiming that they received a signal of four sharp whistles to dump.

The following is a synopsis of the case:

July 6, 1900: Held by grand jury and released under bonds.
June 18, 1901: Indictment filed.
June 19, 1901: Plea of not guilty, with leave to withdraw plea and demur. Case goes over to October term, 1901. Pending.

### CASE AGAINST TUG "GENESTA."

In this case the tug *Genesta*, in charge of Samuel Vickery, master, reached the proper point of deposit on the afternoon of July 22, 1900, having scows Nos. S29 and S30 in tow. Scow 29S, however, failing to clear at that point, the forward pocket being about one-half loaded, while the after middle pocket had considerable material sticking to the sides, the tug started on her return trip without waiting or making any special effort to clear the material. The patrol boat ran alongside and directed the scow man to wind up the scow to prevent the material from escaping into the channels on the way in; but the scow man replied that he had no wrench on board, and the material subsequently escaped into the channels of the harbor by reason of there not being proper facilities on board for winding up the doors properly.

The following is a synopsis of the case:

July 23, 1900: Case referred to the district attorney. Master held in $100 bail and the scow man $25.
June 18, 1901: Information filed. Case pending.

### CASE AGAINST TUG "JOHN FLEMING."

In this case the tug *John Fleming*, in charge of William Kelly, master, proceeded to sea with Dumper No. 25E, fully loaded with cellar dirt, April 18, 1901, and when at a point 1½ miles northwest by west of the Sandy Hook light-ship, and at about 1.30 p. m. of that date, the *Fleming* turned around, the pockets of the dumper having all been discharged. I fully investigated this case and found that the illegal deposit above stated was mainly due to the forward hatch of the dumper not being properly secured and the facilities for properly securing it not being furnished the man in charge, and deeming it of sufficient importance, with a view to the protection of the channels from the employment of unseaworthy vessels and vessels not furnished with proper facilities for protection in heavy weather, the matter was referred to the United States district attorney, and an indictment was drawn against the owners, Charles A. Brown and John Fleming.

The following is a synopsis of the case:

June 18, 1901: Information filed.
June 20, 1901: Plea of guilty as to Brown.
June 26, 1901: Fine of $250 paid. Nol. pros. as to Fleming.

### CASE AGAINST TUG "M. MORAN."

In this case the tug *M. Moran*, in charge of Frank S. Riley, master, proceeded to sea with Dumper No. 15X fully loaded with mud on the afternoon of May 10, 1901. At about 6.45 p. m. of that date, and while off Rockaway shoals, the contents of the dumper were discharged. I investigated this case, and the master claimed that the weather was foggy with a strong easterly gale and a heavy sea from the southeast; but as this did not appear to me as an excuse for the illegal deposit of material in the channels I deemed it proper to refer the case to the United States district attorney for prosecution.

The following is a synopsis of the case:

June 18, 1901: Indictment against the owner, Michael Moran, and the master, Frank S. Riley, filed.

June 19, 1901: Plea of not guilty, with leave to withdraw plea and demur. Case goes over to October term, 1901. Pending.

### CASE AGAINST TUG JAMES D. LEARY.

In this case the tug *James D. Leary*, in charge of Napoleon Fish, master, proceeded to sea with dumper No. 13X, fully loaded with cellar dirt, on the night of June 1, 1901, and when at a point about one and a half or two miles inside of Sandy Hook light-ship, at about 3.30 a. m. of June 2, the contents of the dumper were discharged, the scowman claiming that he had received orders from the master of the *Leary* to discharge the scow. I investigated this case and the master claimed that his boat was in danger, the result of a broken shaft, and he believed he was justified in discharging the load of his tow. I referred the matter to the United States district attorney for such action as he might deem proper, and a warrant was sworn out against Napoleon Fish, master, and Lois Anderson, scowman. Held for grand jury.

### CASE AGAINST TUG AGNES.

In this case the tug *Agnes*, in charge of John Curran, master and owner, proceeded to sea, having in tow the scow *Alma*, fully loaded with cellar dirt, on the night of June 1, 1901. When at about one and a half or two miles inside of Sandy Hook light-ship the contents of the dumper were discharged. I fully investigated this matter, and the master of the *Agnes* made the claim that he saw that the tug *Leary* was in distress with her tow and deemed himself justified in discharging the contents of his tow in order to render assistance to the *Leary*.

I therefore deemed the case of sufficient importance to refer to the United States district attorney for his action.

The following is a synopsis of the case:

June 18, 1901: Information filed.
June 20, 1901: Plea of guilty. Sentenced to pay fine of $250. Fine paid. Case closed.

There has been moved and deposited outside the harbor, at properly designated places and behind bulkheads, in the neighborhood of New York, during the fiscal year ending June 30, 1901, the amount of 12,059,450 cubic yards of material—mud, city refuse, garbage, cellar dirt, ashes, lime, and other material—as per the following recapitulation:

| Place of deposit. | Kind of material. | Amount. |
|---|---|---|
| | | *Cub. yards.* |
| Mud buoy | Mud, etc | 1,237,313 |
| Sandy Hook light-ship | City refuse, mud, etc | 5,354,915 |
| Scotland light-ship | Sand | 417,214 |
| Long Island Sound | Mud, etc | 1,346,088 |
| Hudson River | Dirt, ashes, etc., behind bulkheads and on shore for filling | 423,199 |
| East River | do | 730,875 |
| Harlem River | do | 6,975 |
| Passaic River | do | 8,319 |
| Newark Bay | do | 442,050 |
| New York Bay | do | 1,765,957 |
| Staten Island Sound | do | 48,150 |
| Raritan River | do | 31,090 |
| Shrewsbury River | do | 4,485 |
| Barren Island | Garbage, dead animals, offal, etc., on shore for reduction | 239,820 |
| Total | | 12,059,450 |

Permits issued, 11,732.

From the foregoing statement it will be seen that 7,009,442 cubic yards of mud, street sweepings, cellar dirt, etc., were deposited near the mouth of the harbor; 1,346,088 cubic yards of dredging spoils deposited in Long Island Sound on the State dumping grounds of Connecticut, a small percentage of which, principally sand and shell, was utilized for the propagation of oysters, being scattered over oyster beds under supervision of the shellfish commission of that State; 3,464,100 cubic yards of cellar dirt, ashes, and other inoffensive material were used for filling in behind bulkheads, reclaiming land, etc., and 239,820 cubic yards of garbage, dead animals, offal, etc., were deposited on Barren Island for reduction.

The following is a statement of the appropriation for "Prevention of deposits, New York Harbor, 1901:"

| | | | |
|---|---|---|---|
| For pay of inspectors, deputy inspectors, office force, and expenses of office | | $10,260.00 | |
| Expended to June 30, 1901 | $10,107.95 | | |
| Outstanding liabilities | 136.42 | | |
| | | 10,244.37 | |
| | | | $15.63 |
| For pay of crews and maintenance of five steam tugs and three launches | | 58,340.00 | |
| Expended to June 30, 1901 | $55,601.14 | | |
| Outstanding liabilities | 2,736.50 | | |
| | | 58,337.64 | |
| | | | 2.36 |
| For new boiler and installing same and generally overhauling steam tug *Argus* | | 7,500.00 | |
| Expended to June 30, 1901 | | 7,499.60 | |
| | | | .40 |
| Balance | | | 18.39 |

The following is an estimate of appropriation required for service of the fiscal year ending June 30, 1903, by the supervisor of the harbor of New York:

| Detailed objects of expenditure and explanations. | Estimated amount that will be required for each object. | Amount appropriated for fiscal year ending June 30, 1902. |
|---|---|---|
| Prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City: | | |
| For pay of inspectors, deputy inspectors, office force, and expenses of office | $10,260.00 | $10,260.00 |
| For pay of crews and maintenance of five steam tugs and three launches | 60,000.00 | 58,340.00 |
| For repairs as follows: | | |
| Electric plant and steam steering gear and installing same, and generally overhauling and repairing steam tug Nimrod | | 4,200.00 |
| Total | 70,260.00 | 72,800.00 |

Very respectfully, your obedient servant,

H. M. Hodges,
*Lieut. Comdr., U. S. N., Supervisor.*

Brig. Gen. G. L. Gillespie,
*Chief of Engineers, U. S. A.*

# APPENDIX Z Z.

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## *ANNUAL REPORT OF THE CALIFORNIA DÉBRIS COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

California Débris Commission,
*San Francisco, Cal., July 1, 1901.*

General: The California Débris Commission has the honor to submit the following annual report for the fiscal year ending June 30, 1901. Previous reports of commission may be found as follows:

1894, Report of Chief of Engineers, U. S. A., pp. 3169 to 3187.
1895, Report of Chief of Engineers, U. S. A., pp. 4049 to 4075.
1896, Report of Chief of Engineers, U. S. A., pp. 3861 to 3874.
1897, Report of Chief of Engineers, U. S. A., pp. 3961 to 3980.
1898, Report of Chief of Engineers, U. S. A., pp. 3549 to 3569.
1899, Report of Chief of Engineers, U. S. A., pp. 3747 to 3768.
1900, Report of Chief of Engineers, U. S. A., pp. 5007 to 5070.

The commission was created by act of Congress approved March 1, 1893. During the past year its members have been the following officers of the Corps of Engineers, viz: Col. S. M. Mansfield to February 9, 1901; Col. Jared A. Smith from February 9, 1901; Lieut. Col. W. H. Heuer, and Capt. Herbert Deakyne. Colonel Mansfield was president of the commission to February 9, 1901, and Colonel Smith from February 18, 1901; Captain Deakyne was secretary.

The jurisdiction of the commission extends to hydraulic mining in that portion of the State of California drained by the Sacramento and San Joaquin River systems.

The duties of the commission may be briefly stated to be: First, the prevention of such hydraulic mining as may be deemed injurious to the navigable waters within the commission's jurisdiction, permitting, under proper regulation, such mining in cases where it can be carried on without such injury; second, to mature general plans for the improvement of the rivers whose navigability has been injured by hydraulic mining, and, if practicable, to devise general methods whereby such mining may be carried on without damage to the navigable waters.

The State Débris Commissioner, the Hon. John F. Kidder, died on April 10, 1901. His successor, Mr. W. W. Waggoner, civil engineer, took office near the end of the fiscal year.

Mr. Hubert Vischer, civil engineer, has been in the employ of the commission throughout the year. He has been engaged in surveying and mapping lands to be acquired as sites for restraining works to be built in the Yuba River, developing the details of the project for these works, aiding in the negotiations for the purchase of sites and in making general inspections of hydraulic mining operations in the district under the commission's jurisdiction. His duties have been performed with his habitual thoroughness.

### PREVENTION OF ILLEGAL MINING.

In accordance with the opinion of the Attorney-General of the United States (Appendix A, House Ex. Doc No. 11, Fifty-third Congress, third session), the commission has, since the date of its last annual report (July 1, 1900), called the attention of the owners and operators of nine mines, which were being worked illegally, to the requirements of the law and the duties of the commission in the matter. In seven of these cases applications had been received for permission to mine, but operations were begun before permits were issued. In one of the other cases a subsequent application was received. So far as known, the mines were closed upon receipt of the orders of the commission.

On June 8, 1897, the commission received notice from the United States district attorney that the injunction suit requested by the commission on December 4, 1894, against the North Bloomfield Mining Company, had been decided by Judge Ross, of the United States circuit court, in favor of the United States, and that the injunction had been issued. On June 22, 1897, the commission was informed that an appeal had been taken by the North Bloomfield Mining Company and that their motion to vacate the injunction pending the appeal had been granted. No further official information concerning the case has been received.

### APPLICATIONS AND PERMITS.

The commission has, since it organized, received 520 applications to mine; 406 permits have been granted. A table showing a synopsis of the applications received and the action taken is appended and marked A.

Fifty-six permits have been at different times temporarily suspended, generally on account of the neglect of the owners to comply with instructions concerning the impounding works or on account of accidents to those works.

One hundred and sixty-six permits have been revoked since the organization of the commission, in most cases because the mines have been worked out or abandoned, or have changed hands.

Several mines working under permits from the commission have had their operations stopped during the past two years by injunctions issued by the county courts of this State.

When the first case of this kind arose, the commission requested instructions as to its duty in the premises, and the Attorney-General of the United States, in a letter addressed to the Secretary of War, August 9, 1899, decided that as there appeared to be no question raised as to the validity of the permit issued by the commission, it was not expedient for the commission or any department of the Government to intervene in the suit.

Accordingly, the commission has taken no action in these cases.

No considerable failure of impounding barriers has come to the notice of the commission during the year.

The dams built during the first years of the existence of the commission are now reaching an age at which they may be expected to show signs of decay. Occasionally a break occurs in one of these dams, but the total number of failures is comparatively small and no large percentage of the débris impounded under the direction of the commission has escaped by reason of decay of the dams.

In general, the barriers used are of two types, brush dams and log crib dams. The brush dam is authorized for small mines and when the ravine in which the dam is built is not subject to great freshets. Twenty feet is the usual limit of height. The dam is required to be built of straight live brush placed on the bed of the stream with the butts even and downstream. The brush is built up so that the butts shall be about 2 feet higher than the tops, thus allowing the tops to become embedded in the débris before it rises to the level of the crest of the dam. Gravel and fine brush are required to be added to make the dam tight enough to maintain a pool of water.

When properly built and maintained, the brush dam forms a very satisfactory barrier.

For large mines and in streams subject to heavy flow during storms the log-crib dam is required. Formerly this style of dam was filled with stone to a height of about 6 feet, and above that height the cribs were allowed to fill with débris, the downstream face being kept tight. The débris does not make a satisfactory filling, and latterly the commission has been requiring log-crib dams to be filled with stone. The usual limit of height is 40 feet.

Neither of these types can be called a permanent structure. If kept wet the dams will last a long time, but few of them are wet all the year round. The brush and the logs will decay in time, and a part of the impounded débris may escape. The stone-filled dams will in many cases serve to hold the débris even after the decay of the logs.

Besides these two general types there are dams built of gravel and of stone and other special forms that are authorized under special circumstances, but these forms are not sufficiently numerous to constitute separate classes.

The greatest difficulty met with is the indifference of the miner to the condition of his dam after he receives his permit. Inspection frequently reveals the fact that the required settling pool is not maintained, either because the dam has not been kept sufficiently tight or because the débris has accumulated to the full height of the dam. The owner is then cautioned, or his permit is suspended or revoked, according to the circumstances of the case.

The commission is working toward a more thorough restraint of débris, but is proceeding slowly. Radical requirements in the way of permanent masonry dams would probably cause the closing of many mines on account of the expense involved, and would in great measure nullify that portion of the law which requires the commission to devise methods whereby hydraulic mining may be carried on.

The total amount of material mined under permits during the year is estimated at 1,307,981 cubic yards.

## IMPROVEMENT OF RIVERS.

The duty of devising plans for the improvement of the rivers concerned devolves upon the commission by section 4 of the act. A board has since been appointed, in accordance with the act of Congress approved June 3, 1896, and charged with the duty of preparing plans for the improvement of Sacramento and Feather rivers. The act creating this board being of later date than the act creating the commission, the duty of improving these rivers has been taken up by the board. No plans for the improvement of the San Joaquin River have been made by the commission, for the reasons that this stream is but slightly affected by mining débris and its improvement is under the charge of the engineer officer in whose district it is situated.

The report of the commission on its investigation of sites for restraining works in the Yuba River, together with plans and estimates for the works recommended by the commission, was submitted January 30, 1900, and is printed as House Doc. No. 431, Fifty-sixth Congress, first session.

It may also be found in the Report of the Chief of Engineers, U. S. A., for 1900, pages 5030 to 5070. These plans provide for the construction of various works in the Yuba River at an estimated total cost of $800,000. For their construction there is now available $500,000, of which one-half was appropriated by the United States and one-half by the State of California. The State has made a further appropriation of $150,000, conditioned upon the appropriation of a like amount by the United States. When Congress shall have appropriated the remaining $150,000 the total amount of estimated cost of the works will be available and the commission will feel more sure of its ground in proceeding with construction work than it can feel now with only a part of the necessary money available.

The River and Harbor Committee of the House of Representatives, accompanied by all the members of the commission, the State débris commissioner, and a large party of interested citizens, inspected the proposed sites of the impounding barriers in the Yuba River on June 27, 1901, and saw the immense deposits in that river, some of the pits of old hydraulic mines from which the débris was washed, and also the levees built on both sides of the river to protect the adjacent lands and the city of Marysville from inundation and possible ruin. The plans and proposed methods of impounding the débris now in the Yuba River were explained to the committee.

The law of the United States (act of June 6, 1900) provides that not more than $20,000 in the aggregate shall be expended for lands in the construction of the above works. The commission has been negotiating for the necessary land since September, 1900. Valuable assistance has been rendered by the Marysville Chamber of Commerce. The total area of land required is about 4,000 acres, belonging to over 40 different owners. The progress of the negotiations has been very slow. Suit for the condemnation of one tract of land was begun, but the owner concluded to accept a figure deemed reasonable by the commission, and the prosecution of the suit has been suspended. Thus far deeds have been obtained for about one fourth of the necessary land at a total cost of $6,683. These deeds are in the hands of the United States attorney for the northern district of California for examination of title.

*Money statement.*

| | |
|---|---|
| July 1, 1900, amount appropriated by act of June 6, 1900, for "Expenses of California Débris Commission, 1901" | $15,000.00 |
| Amount expended on account of "Expenses of California Débris Commission, 1901," during the fiscal year ending June 30, 1901 | 6,836.48 |
| Amount unexpended on June 30, 1901 | 8,163.52 |
| Outstanding liabilities | 472.31 |
| Balance (reverted to Treasury) | 7,691.21 |
| August 20, 1900, received by requisition No. 6095, on account of "Expenses of California Débris Commission, 1899" | .40 |
| August 27, 1900, expended on account of "Expenses of California Débris Commission, 1899," and accounted for on account current for month of August, 1900 | .40 |
| October 15, 1900, received by requisition No. 6618, on account of "Expenses of California Débris Commission, 1900" | 1.50 |
| October 16, 1900, expended on account of "Expenses of California Débris Commission, 1900," and accounted for on account current for month of October, 1900 | 1.50 |
| July 1, 1901, amount appropriated by act of March 3, 1901, for "Expenses of California Débris Commission, 1902" | 15,000.00 |
| Amount estimated to be necessary for expenses of California Débris Commission for the fiscal year ending June 30, 1903 | 15,000.00 |

Respectfully submitted.

JARED A. SMITH,
*Colonel, Corps of Engineers.*

W. H. HEUER,
*Lieut. Col., Corps of Engineers.*

HERBERT DEAKYNE,
*Captain, Corps of Engineers*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*

## APPENDIX A.

*Synopsis of applications for authority to mine, with action taken thereon.*

| No. | Name of mine. | County. | Name of applicant. | Mine drains into tributary of— | Nature of tailings reservoir proposed for present use. | Approximate amount of gravel proposed to mine. | Application received. | Order issued to build impounding works. | License granted. | Mined and stored previous to May 1, 1901. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *Cu. yards.* | 1894. | | | *Cu. yds.* |
| 73a | Mitchell *a* | Eldorado | Frank J. Goyan | American | Gravel and brush dam | 80,000 | Oct. 6 | Mar. 27, 1894 | Oct. 23, 1894 | 7,313 |
| 475 | Indian Hill | Sierra | W. B. Meek | Yuba | do | | July 2 | Oct. 6, 1900 | | |
| 476 | Dutch *b* | Plumas | La Porte Consolidated Gold Mining Co. | do | Log crib dam | 480,000 | July 23 | Aug. 27, 1900 | Jan. 28, 1901 | 13,000 |
| 477 | Strawberry | Yuba | J. T. Birminghain | North Yuba | Old mining reservoir. | 10,000 | July 24 | Aug. 13, 1900 | Nov. 20, 1900 | |
| 478 | Garden City | Sierra | C. M. Jurgenson | do | Log crib dam | 80,000 | July 25 | Aug. 27, 1900 | | |
| 479 | Good Hope | Plumas | W. W. Treat and John H. Thomas. | Feather | do | 350,000 | Aug. 11 | Sept. 24, 1900 | | |
| 480 | Woodchuck | Sierra | L. Foss | do | Timber dam | 555 | Aug. 23 | Sept. 11, 1900 | | |
| 481 | Bader Gold | Butte | Bader Gold Mining Co. | Sacramento | Log crib dam | 1,200,000 | Aug. 28 | Sept. 24, 1900 | Dec. 3, 1900 | |
| 482 | Lynchburg | Placer | Ralston Divide Gold Mining Co. | American | do | 300,000 | Aug. 30 | Oct. 1, 1900 | Dec. 24, 1900 | 2,000 |
| 483 | Snake Gulch Gravel | Calaveras | G. H. Lewis et als | Stanislaus | Old reservoir dam | 3,000 | Sept. 4 | Sept. 24, 1900 | | |
| 484 | Dewey Consolidated Gravel Mining Co's. | Placer | Dewey Consolidated Gravel Mining Co. | American | Natural barrier in Indian Canyon. | 800,000 | Sept. 13 | Oct. 15, 1900 | Nov. 26, 1900 | 50,650 |
| 485 | Buckeye | Nevada | P. H. Leonard et als | Yuba | Worked-out pit | 555,000 | Sept. 15 | do | Dec. 10, 1900 | 13,700 |
| 486 | Blacksmith's Flat | Placer | Ralston Divide Gold Mining Co. | American | Log crib dam | 250,000 | Sept. 19 | | | |
| 487 | Pat Goggins | do | do | do | do | 200,000 | Sept. 19 | | | |
| 488 | Sidney Placer *c* | Shasta | Nathan Gardiner | Sacramento | Log and brush dams | 200,000 | Sept. 21 | Works already built. | Oct. 22, 1900 | 6,200 |
| 489 | Miocene | Plumas | A. W. Whitney and C. Y. Hopler. | Feather | Log crib dam and auxiliary brush dams. | 40,000 | Sept. 28 | do | Oct. 29, 1900 | 2,200 |
| 490 | **Wide West Gravel** | **Calaveras** | Wide West Gravel Mining Co. | Stanislaus | Brush, timber, and rock dams. | 800,000 | Oct. 4 | Nov. 26, 1900 | | |
| 491 | **San Francisco** | Placer | H. Sleighter and Thos. Harper. | American | Log and rock dam | 7,000 | Oct. 5 | Works already built. | Dec. 10, 1900 | 2,900 |
| 492 | **Riffle Point** *d* | **Sierra** | **Chas. S. Diesem** | Yuba | 3 log crib dams | 7,407 | Oct. 9 | do | Nov. 20, 1900 | 500 |
| 493 | **Lone Star** *e* | **Plumas** | **Geo. Fitzgerald** | Feather | Log crib dam | 5,600 | do | do | Nov. 12, 1900 | 789 |
| 494 | **Renaissance** | **Sierra** | G. A. and F. W. Bruckerman. | Yuba | **Worked-out pit** | 3,000 | Oct. 12 | Nov. 20, 1900 | | |
| 495 | Badger Hill | Plumas | A. B. Jacks and J. R. Bell. | Feather | Log and brush dam | 1,440 | Oct. 17 | | | |
| 496 | Last Chance | Sierra | W. T. Sherman and D. F. Caya. | Yuba | Dam of Canada mine. | 9,000 | Oct. 12 | Nov. 20, 1900 | June 20, 1901 | |
| 497 | Conger Gulch Gravel. | Shasta | C. N. Kingsbury | Sacramento | Log and brush dam | 280,000 | Oct. 23 | Nov. 12, 1900 | Dec. 17, 1900 | 4,000 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 498 | Independent | Sierra | John McGrath | Yuba | Log crib dam with auxiliary brush barriers | 10,888 | Oct. 24 | Nov. 20, 1900 | June 20, 1901 | .......... |
| 499 | **Chandlerville** | ....do | J. F. Cowdery | ....do | Log crib dam | 11,111 | ....do | ....do | June 20, 1901 | .......... |
| 500 | **Undine and May Day Placer, Consolidated.** | ....do | E. L. Case et al | ....do | Log and brush dam | 25,000 | Oct. 29 | Works already built. | June 10, 1901 | .......... |
| 501 | **Nugget Placer** | Plumas | Mrs. Annie E. Jones | Feather | ....do | .......... | Nov. 1 | Dec. 3, 1900 | .......... | .......... |
| 502 | **Plumas Imperial, No. 2.** | ....do | C. D. Hazzard | ....do | Stone dam and auxiliary log crib dams. | 16,000 | Nov. 5 | ....do | May 6, 1901 | .......... |
| 503 | **Golden Gate** | Sierra | David Corbett | Yuba | Brush dam | 15,555 | Nov. 9 | ....do | .......... | .......... |
| 504 | **American** | Plumas | Chas. Schneider | Feather | Log and brush barrier | 400 | ....do | Works already built. | Dec. 31, 1900 | 80 |
| 505 | Lady's Cañon | Sierra | John Costa et al | Yuba | Old hydraulic pits | 16,000 | Nov. 17 | ....do | June 10, 1901 | .......... |
| 506 | Dudley Placer | Nevada | W. B. Dudley et al | Nevada | Worked-out pit | 32,000 | Nov. 26 | .......... | Jan. 28, 1901 | 2,300 |
| 507 | Reichel Claim | Calaveras | Eagle Gold Mining Co | Calaveras | 2 log crib dams | 387,200 | Dec. 4 | Works already built. | Jan. 30, 1901 | 900 |
| 508 | Rose Hill | ....do | Emery Gold Mining and Water Co. | ....do | Log crib dam with auxiliary brush dams. | 806,000 | Dec. 22 | .......... | .......... | .......... |
| | | | | | | | 1895. | | | |
| 509 | Dad's Gulch | Yuba | Peter H. Russell | Yuba | Log and brush dam | 20,000 | Jan. 2 | June 10, 1901 | .......... | .......... |
| 510 | Gold Hill Placer | ....do | Wm. Abbott and Louis W. Clark. | Feather | ....do | 5,000 | Jan. 7 | Works already built. | Feb. 11, 1901 | 500 |
| 511 | Maxey | Calaveras | E. C. and P. J. Rigney | Calaveras | Log crib dam | 1,300,000 | Jan. 17 | Apr. 29, 1901 | .......... | .......... |
| 512 | Chaparral Hill | Sierra | F. C. Le Blond and W. E. Olmsted. | North Yuba | ....do | .......... | Mar. 1 | June 10, 1901 | .......... | .......... |
| 513 | Fuller Flat | ....do | Ah Lung | Yuba | Stone and brush dams | 50,000 | Mar. 2 | June 20, 1901 | .......... | .......... |
| 514 | Lava Point | ....do | J. H. Skinner | ....do | Log dam | .......... | Mar. 26 | .......... | .......... | .......... |
| 515 | Hungarian Hill | Plumas | J. W. Dempsey | North Yuba | Log crib dam | 4,000 | ....do | Apr. 15, 1901 | .......... | .......... |
| 516 | Cadmus | ....do | J. S. Carter and Wm. Deal | Feather | No works necessary | 5,185 | Mar. 27 | .......... | May 20, 1901 | .......... |
| 517 | Avalanche | Calaveras | Chas. Lilly and W. E. Emery. | Stanislaus | Log crib dam | 80,000 | Apr. 3 | Works already built. | May 27, 1901 | .......... |
| 518 | Taylor Diggings Placer Claim. | Plumas | W. J. Cox and F. A. Keesy. | Feather | No works necessary | 7,000 | May 7 | .......... | ....do | .......... |
| 519 | Joseph Thomas | Amador | A. Lundberg | Cosumnes | Brush dam | 30,000 | May 18 | June 24, 1901 | .......... | .......... |
| 520 | Victor Placer | Sierra | S. I. Simmons et al | Yuba | Log crib dam | 48,311 | June 5 | ....do | .......... | .......... |

*a* Not heretofore reported.
*b* License suspended June 20, 1901.
*c* **Mine worked out. License revoked April 1, 1901.**
*d* **License revoked April 8, 1901.**
*e* **License suspended March 4 to 11, 1901.**

*Table of additional information relative to applications received up to June 30, 1900.*

| No. of application. | License granted. | Mined and stored previous to May 1, 1901. | Remarks. |
|---|---|---|---|
| | | *Cubic yards.* | |
| 8 | | 95,500 | |
| 9 | | 11,890 | |
| 11 | | | License suspended Oct. 22, 1900. |
| 12 | | | Do. |
| 13 | | | Do. |
| 14 | | 233,880 | |
| 15 | | 366,334 | |
| 25 | | 13,103 | |
| 33 | | 855 | |
| 46 | | | License revoked Jan. 7, 1901. |
| 47 | | | License suspended July 2, 1900. |
| 52 | | | License revoked Dec. 31, 1900. |
| 54 | | 4,500 | |
| 60 | | | Will not be worked. |
| 62 | | | Do. |
| 63 | | 2,929 | |
| 65 | | | Do. |
| 67 | | | Do. |
| 69 | | 481,460 | |
| 73 | | | Do. |
| 80 | | 26,065 | |
| 89 | | 13,145 | |
| 92 | | 1,686 | |
| 94 | | 95,550 | |
| 100 | | 29,020 | |
| 101 | | 623 | |
| 105 | | 3,375 | License suspended Mar. 4, 1901. |
| 110 | | | Will not be worked. |
| 114 | | 773 | |
| 115 | | 1,835 | |
| 126 | | | Do. |
| 127 | | | License suspended from Dec. 31, 1900, to June 10, 1901. |
| 128 | | 20,500 | |
| 131 | | | Mine will not be worked. |
| 132 | | | Do. |
| 135 | | | Do. |
| 137 | | | Do. |
| 138 | | | License revoked July 2, 1900. |
| 140 | | 7,600 | License revoked June 10, 1901. |
| 141 | | | Mine will not be worked. |
| 142 | | | License suspended Oct. 29, 1900. |
| 149 | | | License suspended Oct. 22, 1900. |
| 151 | | | License revoked July 2, 1900. |
| 152 | | | Mine will not be worked. |
| 153 | | | License revoked Nov. 12, 1900. |
| 158 | | | License revoked July 9, 1900. |
| 162 | | | License revoked July 2, 1900. |
| 164 | | | License revoked July 9, 1900. |
| 170 | | 4,104 | License suspended from June 4 to Dec. 10, 1900. |
| 175 | | | Mine will not be worked. |
| 181 | | 3,250 | |
| 193 | | 137,600 | Now operated by Wm. Nicholls, jr. |
| 197 | | 3,370 | |
| 198 | | 10,646 | |
| 200 | | 29,750 | |
| 206 | | | Mine will not be worked. |
| 212 | | | Do. |
| 215 | | | License suspended from June 4, 1900, to January 28, 1901. |
| 218 | | | Mine will not be worked. |
| 223 | | 17,500 | |
| 229 | | | License suspended January 14, 1901. |
| 236 | | | Mine will not be worked. |
| 238 | | | Do. |
| 240 | | 120,500 | |
| 241 | | | Supplemental application. |
| 242 | | 32,330 | |
| 246 | | | License revoked July 2, 1900. |
| 249 | | 10,151 | |
| 252 | | | Do. |
| 256 | | | Do. |
| 266 | | 48,545 | |
| 267 | | 917 | |
| 275 | | | Mine will not be worked. |
| 279 | | 4,465 | |
| 280 | | 1,675 | License suspended May 27, 1901. |
| 285 | | | Mine will not be worked. |
| 286 | | 2,000 | |
| 287 | | 990 | |
| 289 | July 23, 1900 | | |

*Table of additional information relative to applications received up to June 30, 1900*—Continued.

| No. of application. | License granted. | Mined and stored previous to May 1, 1901. | Remarks. |
|---|---|---|---|
| | | *Cubic yards.* | |
| 293 | | 794 | |
| 295 | | 3,400 | |
| 299 | | 590 | |
| 305 | | 800 | |
| 311 | | 10,300 | |
| 312 | | 16,300 | |
| 314 | | 1,675 | |
| 316 | | 7,500 | |
| 317 | | 19,900 | License suspended Mar. 4, 1901. |
| 318 | | 40,900 | |
| 319 | | | Mine abandoned; license revoked Oct. 29, 1900. |
| 320 | | | Mine abandoned; license revoked July 2, 1900. |
| 324 | | 20,850 | License revoked July 9, 1900. |
| 326 | | | License suspended May 27, 1901. |
| 329 | | 226,500 | |
| 332 | | | License revoked July 2, 1900. |
| 337 | | | See No. 147. Supplemental application. |
| 344 | | 14,250 | License revoked Jan. 7, 1901. |
| 348 | | | License revoked Oct. 22, 1900. |
| 349 | | 4,337 | |
| 353 | | 7,450 | |
| 357 | | | License revoked Dec. 3, 1900. |
| 358 | Jan. 7, 1901 | 1,185 | |
| 359 | | | License revoked July 2, 1900. |
| 363 | | 1,300 | |
| 371 | | 1,126 | |
| 378 | | 73,331 | |
| 381 | | | See supplemental application No. 416. |
| 384 | | 2,371 | |
| 390 | | 7,961 | |
| 394 | July 2, 1900 | | |
| 399 | | | Mine abandoned. |
| 401 | | | License revoked Dec. 31, 1900. |
| 403 | | 6,060 | |
| 404 | | 1,650 | |
| 405 | | 620 | |
| 410 | | 162,860 | |
| 412 | | 4,400 | |
| 414 | | 270,450 | |
| 416 | | | See supplemental application No. 434. |
| 417 | Nov. 20, 1900 | 320 | |
| 419 | | 5,500 | |
| 420 | | 1,170 | |
| 421 | Nov. 20, 1900 | | |
| 422 | | | Mine abandoned. |
| 428 | Jan. 2, 1900 | | |
| 429 | | | License suspended July 2, 1900. |
| 430 | | 1,930 | |
| 431 | | 213,207 | |
| 432 | Nov. 20, 1900 | | License suspended Mar. 4, 1901. |
| 434 | | | See supplemental application No. 457. |
| 435 | | 25,008 | |
| 438 | Nov. 20, 1900 | | |
| 439 | | 2,100 | License suspended May 27, 1901. |
| 440 | | 33,600 | |
| 443 | | 99,095 | |
| 444 | | 1,200 | |
| 445 | | | License revoked Jan. 7, 1901. |
| 447 | | 9,980 | |
| 448 | | | Mine abandoned. |
| 449 | Dec. 17, 1900 | 2,425 | |
| 451 | Nov. 20, 1900 | 500 | License revoked Apr. 8, 1900. |
| 453 | Oct. 15, 1900 | 243,000 | |
| 454 | | 58,800 | |
| 455 | Dec. 31, 1900 | 572 | |
| 457 | | | See supplemental application No. 495. |
| 458 | | 595 | |
| 459 | | 23,700 | |
| 461 | Jan. 7, 1901 | 3,191 | |
| 468 | | 3,500 | |
| 470 | | | Order issued Aug. 27, 1900, to build impounding works. |
| 472 | Dec. 24, 1900 | 7,300 | |
| 473 | Aug. 20, 1900 | 130 | |
| 474 | Nov. 20, 1900 | | Order issued Aug. 13, 1900, to build impounding works. |

# APPENDIX A A A.

## REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION—SAN JUAN HARBOR, PORTO RICO.

### *REPORT OF CAPT. C. A. F. FLAGLER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

SAN JUAN, P. R., *July 20, 1901.*

GENERAL: I have the honor to submit the following report of operations upon rivers and harbors under my charge during the fiscal year ending June 30, 1901.

Very respectfully, your obedient servant,

C. A. F. FLAGLER,
*Captain, Corps of Engineers.*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*

### WRECK OF STEAMER CRISTOBAL COLON IN SAN JUAN HARBOR, PORTO RICO.

In the spring of 1898 the side-wheel iron steamer *Cristobal Colon*, length 255 feet, beam 33 feet, was sunk intentionally in the entrance to the harbor of San Juan, with a view to closing the entrance. Although not closed, the entrance was made very narrow and difficult of navigation, and the removal of the wreck was recommended.

Under date of December 7, 1900, a contract was entered into with Jose Enrique Denton, of San Juan, P. R., for the removal of the wreck to a minimum depth of 36 feet at mean low water, for the sum of $7,500, the work to be completed, as bid by him, on or before April 27, 1901.

The work of removal was completed according to specifications by May 27, 1901.

The amount expended during the year is $7,709.27.

# APPENDIX B B B.

## BRIDGES AT WASHINGTON, DISTRICT OF COLUMBIA.

*REPORT OF LIEUT. COL. CHAS. J. ALLEN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901, WITH OTHER DOCUMENTS RELATING TO THE WORKS.*

1. Repair of the Aqueduct Bridge across Potomac River at Washington, District of Columbia.
2. Memorial Bridge across Potomac River at Washington, District of Columbia.

United States Engineer Office,
*Washington, D. C., July 20, 1901.*

General: I have the honor to forward herewith * * * my annual report for year ended June 30, 1901, for Memorial Bridge and repairs to the Aqueduct Bridge * * *.

Very respectfully, your obedient servant,

Chas. J. Allen,
*Lieut. Col., Corps of Engineers.*

Brig. Gen. G. L. Gillespie,
*Chief of Engineers, U. S. A.*

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## B B B 1.

### REPAIR OF THE AQUEDUCT BRIDGE ACROSS THE POTOMAC RIVER AT WASHINGTON, DISTRICT OF COLUMBIA.

### WORK DONE DURING FISCAL YEAR ENDED JUNE 30, 1901.

### RECONSTRUCTION OF PIER NO. 4.

At the opening of the fiscal year the contractors had obtained practically all of the dimension stone required for the pier and installed pumps and derricks, repaired the false works, and tightened the cofferdam.

As measures of precaution a fire pump was installed upon the cofferdam and a temporary fence was constructed for the purpose of controlling travel across the two spans resting on the false work. The ends of the bridge spans were then brought to bear upon the false work on July 11, 1900, for the purpose of testing the latter. No appreciable settlement from the weight of the spans was observed.

This test being considered satisfactory, the removal of the old pier was begun on July 30 and proceeded satisfactorily and without interruption until August 31, 1900, when it had been entirely removed. As the stone was removed from the pier the condition of the masonry was found to be even worse than had been anticipated. A portion of the stone removed from the pier was placed in the cofferdam to add to its stability, and some of this stone was laid aside for use in reconstructing the pier. The remainder of the material removed was deposited upon the training dike in the Virginia channel of Potomac River.

The débris overlying the rock was removed, and the rock bed leveled off so as to afford an excellent foundation, and the placing of the concrete footing was begun September 8 and completed September 13, 1900.

The laying of masonry upon this concrete foundation was commenced September 17, and although the weather was unusually favorable for this work, the progress was very slow and the setting of the coping was not completed until December 13, 1900.

The trusses were lowered to their bearings on the bridge seats on December 31.

During January, 1901, the cramps in the coping were set and leaded in, the bridge trusses properly aligned, the traffic contractions removed from the roadway, and the removal of the false work and ballast from the cofferdam was begun.

The remainder of the false work and of the ballast was removed early in February and the demolition of the cofferdam was at once begun. This portion of the work was more or less retarded during February and into the spring by ice and freshets. It was still in progress at the end of the fiscal year, though it is believed that ten or fifteen days of work will complete the contract. A portion of the embankment placed around the cofferdam was first dredged away, after which the sheet piling was drawn and an attempt made to lift the crib bodily by attaching scows to the timbers and utilizing the rise of the tides for lifting power. This effort was only partly successful, as, owing probably to a heavy deposit of silt, the lower portion of the crib separated from the upper portion and remained embedded in the mud. After repeated failures to raise the remainder of the crib by this process, and owing to interruption by freshets, the contractors began to lift out the timbers one by one with a steam derrick boat, the timbers being lifted by chains placed by a diver. This method was continued with fair success until the close of the fiscal year, when but a small amount of timber remained to be removed.

## EXAMINATION OF OTHER PIERS.

In compliance with a call from Congress an examination of piers Nos. 1, 2, 3, 5, 6, 7, and 8, was made by a submarine diver February 18–24, 1901, and a special report rendered thereon, by this office, under date of February 25, 1901. A copy of this report and related correspondence is appended hereto. During the examination several piers of the bridge were found to be in bad condition.

### TEMPORARY PROTECTION OF OTHER PIERS.

As a result of this examination Congress, by act approved March 3, 1901, provided:

> That of the unexpended balance of the appropriations for the repairs to the Aqueduct Bridge, District of Columbia, the sum of one thousand four hundred and sixty-five dollars may be used under the direction of the Secretary of War for the temporary protection of said bridge.

This work, which was done by hired labor, was actively commenced April 29, and completed June 13, 1901, being delayed during its progress by two freshets in the river, during which operations had to be entirely suspended.

All holes discovered in the piers (during two thorough examinations by a diver) large enough and deep enough to receive and hold a half sack or more of concrete were filled in, the bags being shoved into place and tamped so as to fill irregularities. Afterward riprap was placed, with the aid of the diver, so as to cover the largest of these patches, as a protection against erosion and the impact of logs, ice, and other drift during times of freshet.

The largest single cavity was found in the ice breaker of pier No. 5, 14.75 cubic yards of concrete being required for its repair; the next largest cavity was one of 6.5 cubic yards in the south side of pier No. 6; while cavities of 5.5 cubic yards were found both in the south side of pier No. 1 and in the north side of pier No. 8; and one of 3.1 cubic yards in the north side of pier No. 7. The other cavities filled in were smaller in size, averaging generally but a few cubic feet in contents.

The hole in the ice breaker of pier No. 5 was located from 7 to 12 feet below low water, but with this exception all of the large holes mentioned were within a few feet of the river bed.

The amounts placed in and around the several piers are as shown in the following table:

| Pier. | Amount of concrete used. | Amount of riprap used. |
|---|---|---|
| | *Cu. yards.* | *Cu. yards.* |
| 1 | 6 | 30 |
| 3 | 1 | |
| 5 | 17.25 | 65 |
| 6 | 7 | 24 |
| 7 | 3.75 | 15 |
| 8 | 7.75 | 25 |
| Total | 42.75 | 159 |

From the above figures it will be noticed that the piers were even in somewhat worse condition than was thought when the report of February 25, 1901, was written.

A force, consisting of a diver and three attendants and a foreman and four laborers, was employed during both the concreting and the riprapping. The total unit cost, including superintendence, labor, materials, and incidentals, was about $26.80 per cubic yard for the concrete and $1.80 per cubic yard for riprap, both in place. (The contract price for 195 cubic yards of the same class of concrete work, placed in 1894, was $25 per cubic yard.)

Although the repaired and protected piers are in about as good condition as it was practicable to place them without entire reconstruction. inasmuch as most, if not all, of these cavities just repaired had formed since the similar repairs were completed in 1894, it seems entirely probable that the process of dissolution will continue indefinitely if the present piers are allowed to remain.

These old piers, 1, 2, 3, 5, 6, 7, and 8 were built in 1834–1840. Pier No. 4 was also originally built 1834–1840, but it was entirely reconstructed in 1900.

This bridge should be rebuilt with new piers and abutments (pier 4 excepted) and new superstructure, all to conform to present and prospective requirements.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $53,652.37 |
| June 30, 1901, amount expended during fiscal year | 27,295.70 |
| July 1, 1901, balance unexpended | 26,356.67 |
| July 1, 1901, outstanding liabilities | 222.00 |
| July 1, 1901, balance available | 26,134.67 |
| July 1, 1901, amount covered by uncompleted contracts | 11,000.00 |

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### CONTRACT IN FORCE.

With the Central Contracting Company, of New York, N. Y., for reconstruction of pier No. 4, Aqueduct Bridge, District of Columbia.

Approximate amount of contract: $37,747.

Date of contract: May 12, 1899.

Approved: May 26, 1899.

Date for commencement: May 15, 1899.

Date for completion: November 30, 1899.

The following extensions were granted: To July 31, 1900; to November 30, 1900; to January 31, 1901; to March 31, 1901; to May 31, 1901; and to July 15, 1901.

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### LETTER OF MAJ. FREDERIC V. ABBOT, CORPS OF ENGINEERS.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
*Washington, February 15, 1901.*

COLONEL: A call is made from Congress for an immediate report as to the stability and condition of the piers of the Aqueduct Bridge and whether their condition is such as to sustain with safety a new superstructure fitted for street cars, carriages, and foot passengers.

The information is desired in connection with legislation at present session for rebuilding or such action as may be proper. Hence the necessity for prompt report.

Will you please specifically state whether in your opinion the present piers can with safety be used in connection with a new superstructure of the character indicated by the call for information. If a further immediate examination by a diver will assist in securing the desired information, his employment is authorized.

If the present piers are not considered safe under conditions considered, an opinion is desired as to proper action to be taken, and as to the approximate cost of a new bridge to replace the present structure,

Also an estimate of the amount required for a proper examination of the present piers. Also amount required for securing proper plans, etc., for a new bridge in case an examination is to be provided for rather than reconstruction.

By command of Brig. Gen. Wilson:

Very respectfully, your obedient servant,

FREDERIC V. ABBOT,
*Major, Corps of Engineers.*

Lieut. Col. CHAS. J. ALLEN,
*Corps of Engineers.*

### LETTERS OF LIEUT. COL. CHAS. J. ALLEN, CORPS OF ENGINEERS.

UNITED STATES ENGINEER OFFICE,
*Washington, D. C., February 25, 1901.*

GENERAL: I have the honor to submit the following report in regard to the Aqueduct Bridge, in compliance with the requirements of letter from the Chief of Engineers dated February 15, 1901 (38188-1).

Early on the 16th instant I sent a messenger for the diver who was engaged in 1895 by the contractors upon certain work of repair to the piers of the Aqueduct Bridge. Arrangement was made with him for an examination of the piers of the bridge to the extent that time would permit.

Examination of all available records and drawings of the existing bridge and computations of estimates were at once undertaken in the office.

The time in which to render the report required was short and therefore, at the best, the plans and estimates submitted are but approximations.

The piers of the Aqueduct Bridge, constructed to carry the Chesapeake and Ohio Canal across Potomac River at Georgetown, were built about 1835-1840. They are composed of Potomac River gneiss, excepting the ice breakers, which are of granite. Between the main river abutments there are 8 piers about 110 feet apart between faces at the top. Every third pier is about 16 feet wide at top; the remaining piers have top widths of about 7 feet 6 inches. The top of each pier is about 30 feet above the plane of mean low tide. These piers were built within cofferdams and were supposed to have been constructed of substantial masonry founded directly upon the rock bed of the river.

There appear, from accounts of the work, to have been many difficulties attending the construction.

According to the original plan adopted the superstructure was to have consisted of nine stone arches, the two broader piers to serve as sectional abutments. For economical reasons, however, a wooden truss bridge and trough of kyanized timber were substituted.

This structure was the "Potomac Aqueduct."

In 1866 the Alexandria Canal Company leased their canal and the bridge (Aqueduct Bridge) to Messrs. Quigley, Wells, and Dugan for a period of ninety-nine years. The lessees replaced the old truss, which had become decayed and unsafe, by a Howe truss, and the latter was subsequently strengthened by wooden arches. By act of Congress approved July 27, 1868, the lessees were authorized to erect and maintain, in connection with the Aqueduct, a highway bridge, and to charge certain specified rates of toll. A floor system was placed on the top chord of the Howe truss, trestles and spans for the approaches were built, and the bridge used as a highway until 1886. For several years prior to the last-named date, however, the condition of the bridge was not deemed satisfactory, and two examinations, in detail, were made of it, under the direction of the Chief of Engineers, and the results reported to Congress. Both examinations resulted in reports to the effect that the bridge superstructure was unsafe for public travel.

An act of Congress approved June 21, 1886, provided for the establishment of a free bridge, either by the purchase of the Aqueduct Bridge piers and the erection of an iron bridge thereon, or by the construction of a new bridge at or near the Three Sisters, about one-half of a mile above the Aqueduct. Under the provisions of this act the bridge was purchased by the United States. The existing iron superstructure was constructed by the Engineer Department, being completed in 1888.

On September 15, 1888, the custody of the bridge was transferred to the District Commissioners, in compliance with a requirement of the District appropriation act of July 18, 1888.

Attention appears to have been first called to the defective construction of the piers immediately after the freshet of June, 1889. The sectional area of the river is much contracted at the site of the bridge by the number and size of the piers and especially by the extension of the embankment of the south approach into the river. The effect of this embankment is to produce violent eddies during freshets in the vicinity of the first pier from the south end of the bridge, known as pier No. 1. Soon after the freshet had subsided pier No. 1 was observed to have moved several inches to the northward, and a nearly vertical crack was also noticed extending entirely through pier No. 4, which was situated about in the center of the channel, from the coping down to low tide, at least. An examination by a diver revealed the fact that the movement of pier No. 1 and the crack in pier No. 4 were both due to the erosion of the bases of these piers. Pier No. 1 was repaired by the use of concrete in bags with riprap stone protection. Pier No. 4 was banded by iron rods to prevent further cracking. This work required immediate attention, as delay awaiting an appropriation might mean the loss of two piers and four spans of the bridge, and was done by the District Commissioners. This work being but partial and partly temporary, a resolution of the Senate, dated January 21, 1893, provided as follows:

"Whereas by the annual report of the Commissioners of the District of Columbia for the year ending June thirtieth, eighteen hundred and eighty-nine, it is made to appear that the masonry composing the piers of the Aqueduct Bridge was largely in need of repair, and at least one of the piers thereof had settled four inches to the north, and large cavities caused by erosion existed in more than one of the said piers, and that a large sum of money was expended in the repair of the same; therefore,

"*Resolved*, That the Secretary of War is hereby authorized and directed to cause to be made a thorough examination of the piers of said bridge by some competent officer of the Engineer Corps of the United States Army, and report to Congress at an early day—

"*First.* If any one of said piers of said bridge has so settled as to be out of plumb; and if so, which way it leans.

"*Second.* What cavities, if any, exist in any of the piers of said bridge requiring repairs or in any way impairing the supporting capacity of said piers, or either of them, making specific report of defects, if any, in each pier.

"*Third.* That he transmit a copy of the report of the officer of the Engineer Corps charged with the duty of constructing the piers of the said bridge, showing as minutely as may be the plans and processes used in the construction thereof.

"*And be it further resolved*, That the Commissioners of the District of Columbia be required to transmit to Congress a detailed report of any and all expenses incurred in the repair of the piers of said bridge since the same became the joint property of the United States and the District of Columbia, and by whom said repairs, if any, were made, and under whose direction or supervision the same were made, and, as fully as may be practicable, a detailed account of the work of making the same, and a copy of the report of any officer of the District or employee thereof engaged in the said work, or upon any part thereof, including a statement as to whether the said Commissioners have ever caused either or all of the piers of said bridge to be tested with plumb and level, or any other suitable instrument, to see if either or all of them are out of plumb; and if so, the result of such examination."

The examination provided for consisted mainly of inspection by a diver and measurements and levels taken on the piers, and was made under the direction of Major Davis, Corps of Engineers, whose reports under dates of June 21, 1893, and July 17, 1893, are printed in Appendix A A A to the report of the Chief of Engineers for 1895, pages 4085–4091. The results may be summarized by stating that piers Nos. 2, 3, 5, 6, 7, and 8 were found to contain small cavities and minor defects, and to be in need of some repair. The riprap placed about pier No. 1 prevented a thorough investigation of that pier. Pier No. 4 was found to have been seriously eroded at the west end, where, under the ice breaker, a cavity was found extending entirely across the pier with a height of about 16 feet and a length, measured parallel to the pier, of from 7 to 11 feet. The eroded cavity had caused a settlement of the west half of the pier and a nearly vertical crack had developed near its middle. The estimated cost of repairing the piers was $51,070. The examination by the diver was necessarily largely through the sense of feeling, and revealed only in a general way the condition of the exterior faces of the masonry below the water.

In an act of Congress approved August 7, 1894, an appropriation of $51,070 was made for the repair of all the defective piers. A contract was made for repair to piers Nos. 2, 3, 5, 6, 7, and 8 by Portland cement concrete in bags, to be put in place by a diver, and for the repair of pier No. 4 by means of a cofferdam. The diver who placed the concrete in bags found several cavities directly beneath various piers into which he crawled to remove mud and débris, and he also reports that the pier faces were in a far from satisfactory condition. After the cofferdam at pier No. 4 had been constructed and pumped out, and the masonry below low-water line exposed, a condition of affairs was revealed that is best given in Major Davis's report of November 30, 1895, printed in House Doc. No. 158, Fifty-fourth Congress, first session, where he says of the pier:

"It was found that the timber cross braces of the old original cofferdam built in 1839, 16 inches square and 21 in number, had been left in the pier and the masonry built around them. It was also found that the old masonry had not been started from solid rock, as shown on the original plans, but upon riprap stone apparently thrown in to level off, without removing the débris upon the rock, which is fissured and seamed and has many projecting nodules.

"Layers of mud and sand were found under the lowest of the old shores, while lying on the rock diagonally under the masonry of the pier an old tree was found which must have been there before the pier was built. For about 12 feet above this insecure foundation the masonry is of the poorest quality possible and hardly worthy of the name of masonry. The stones were apparently put in as they came from the quarry without the slightest reference to beds, being set on end, edge, and in every conceivable manner, while few, if any, traces of mortar or cementing material were found. The old tree spoken of was reported by the diver in his examination, and also the very rough quality of the masonry, and careful soundings with an iron-pointed rod showed very irregular offsets, but it was thought the tree had been lodged since the erosion of the pier, and that heavy riprap stone deposited around the pier would account for the roughness found by the diver and the indications of the sounding rod, as it seemed incredible that the condition of affairs afterwards found could really exist. The Acting Secretary of War and the Chief of Engineers made an inspection of this pier on June 24, 1895, and may recall the condition of the masonry.

"In view of the poor quality of the masonry at the bottom, it was decided that after the completion of the contract for repairing the cavity under the upstream end of the pier, it would be necessary to remove the defective masonry in the remainder of the pier and replace it by masonry of proper quality founded on the solid rock. The appropriation then available being insufficient for this extra work, it was decided to ask Congress for a further appropriation. As the cofferdam would be needed for this work, a modification of the contract was made by which the Government became the owner of the dam by purchase from the contractors, and this dam is now in place."

Following the foregoing report Congress, by act approved June 8, 1896, appropriated $65,000 for reconstruction of pier No. 4 of the Aqueduct Bridge across the Potomac River at Georgetown, D. C., to be available until expended, and the reconstruction of the pier was assigned to me by the Chief of Engineers.

My first acquaintance with this bridge was in January, 1896.

The work of reconstruction of pier No. 4 began, under contract, about May 28, 1897, but the progress was slow, and in the spring of 1898 work upon it suspended. Another contract was then made, and under it the old pier was taken down and a new one built by the close of 1900.

In taking down the old pier it was found that the masonry was of even poorer quality than had been believed. The upper portion of the pier, as well as the lower, was of such poor quality that it was readily removed with picks and shovels. At about water level the character of the masonry improved slightly and was somewhat more difficult to remove, while below the level of low tide it deteriorated rapidly and no cementing material, other than river mud, appeared toward the base, which rested upon riprap and débris, as previously described. The lower stones were removed without the slightest difficulty by chain hooks only.

This pier, as rebuilt, is of good, strong masonry. All the other piers (old piers) are of good size, and if they had been properly built they would be capable of sustaining much greater loads than they now carry.

Examination, February 18–24, 1901, of piers Nos. 1, 2, 3, 5, 6, 7, and 8 of Aqueduct Bridge.

Pier No. 1 was repaired in 1889, and the other piers named received repairs in 1894.

The following report by Mr. John Meigs, inspector, gives an account of the examinations of these piers just made by a diver:

WASHINGTON, D. C., *February 25, 1901.*

COLONEL: I beg to submit the following report on the condition of the subaqueous portion of the piers of the Aqueduct Bridge, as found during the diver's examinations of the past week.

This work was started on Monday, the 18th instant, and though somewhat hindered by the ice on the river and the prevailing high winds, was carried through at the rate of a pier per day, the examination of the last one being completed on Sunday, the 24th.

The examination has been carefully conducted and is believed to be as thorough as may be under the circumstances. The piers were divided into sections in the following manner: From a hawser stretched around, above water, a weighted line was suspended alongside of the pier and extending down to its base, which line served as a guide to the diver in his operations. By shoving this along about 3 feet at a move, and the diver working up and down along it, from the river bottom to the water surface, the entire under-water surface of the pier was covered.

Samples of mortar were obtained where it was possible, but only with considerable difficulty.

Even where the joints were full it was almost impossible, on account of the soft and crumbly condition of the mortar, to get the sample fragments to the surface before dissolution.

Piers Nos. 2, 3, and 7 were reported in "good condition," the adjective being used in a purely comparative way, and not intended to have any positive value in a modern engineering sense.

Piers No. 1 and 6, while generally in fair condition, have in them minor cavities of limited extent, and piers 5 and 8 are in a condition which can be mildly stated as thoroughly bad—in the case of pier 5 as even dangerously so.

No indications were found in any of them of the previous repair work which had been done, all traces of it being either concealed by mud or covered up by the protective riprap which was placed over it.

Taking up the piers in order form south to north the results of the investigation are briefly as follows:

*Pier No. 1.*—The riprap extends up on front of the ice breaker to within 13 feet of low water, extending outward some distance, but sloping off rather abruptly around the sides of the pier. There is a small amount of riprap along the north side, and a quantity of large stones were found along the south side, the east end rising clear from the mud bottom.

A hole was found opposite the southeast corner 4 feet from the bottom and about 1 foot high, 5 feet long, and 3 feet deep. The stone directly below this and somewhat larger in size is loose also, and ready to fall out at slight provocation.

Except for this opening the masonry seems to be tight all around, no loose stones being found, and the joints being filled with mortar, except near the water line, where, as in all of the piers, the joints are washed clear for some inches back from the face.

*Pier No. 2.*—The riprapping here, also, is only on the front of the ice breaker, extending up to within 12 feet of low water and sloping off abruptly around the curve of the end. On the sides the pier rises from the mud bottom.

The entire pier seems to be in fair condition for this class of masonry, no stones missing, and the joints being apparently all full, except the eroded ones along near water line.

*Pier No. 3.*—Riprap extends from front of ice breaker within 6 feet of low water along entire south side to southeast corner, where it is about 14 feet below water. The east end and north side rise clear from the mud bottom, the masonry having a spread of 8 or 10 feet at the bottom.

Several stones about 4 feet below water, near the middle of the south side, have open joints around them into which the probing-rod could be inserted 15 or 18 inches.

Except for these the pier is reported in fair shape. For a couple of feet below water the joints are much eroded, but below this they appear to be full, and there are no holes in masonry nor any missing stones.

*Pier No. 5.*—This is by far the worst of the seven old piers.

The riprap extends up to within 10 feet at low water on the front of the ice breaker and slopes steeply off in all directions, not extending around the curve on either side. Along the north side a quantity of loose stone, weighing a ton or two apiece, are scattered along.

Between the third and fourth courses of the granite ice breaker the horizontal joint under the five center stones is open an inch or more, and into it a ¾-inch rod can be inserted nearly 3 feet. The vertical joints also between these stones are clear of mortar, and one of them is projecting probably an inch beyond its original position in the wall.

Further down, directly on the front of the ice breaker, is an irregular-shaped hole of about 22 square feet area and from 2.5 to 3 feet deep. The joints at the back of this hole are wide open and extend in several feet. The hole is 6 feet wide and extends down visibly to the top of the riprap and, in the opinion of the diver, runs still further downward, it being found possible to probe with a small rod some distance in a vertical direction into the bottom of it.

A little farther around to the south and still on the curve of the ice breaker is a loose stone, 2 by 3 feet in dimensions, partly projecting.

The spread of the pier footing here is not nearly as great as in most of the other piers, and slopes up with tolerable uniformity. Six rows of transverse timbers were found in the masonry, instead of three or four as in the others, and these large timbers being only a few feet apart cut up the masonry considerably.

The joints on the south side are most of them wide open, many from 3 to 5 inches on the face, and extending in from 2 to 5 feet, or probably more, had a smaller and longer probing rod been used. The bonding of the masonry is noticeably poor and the openings of the joints are of every conceivable shape. This condition extends from the bottom of the pier to low-water line.

The north side is in nearly as bad condition as the south. Around all of the timbers the joints are very large and open, extending in several feet and some of them were of sufficient size to permit the diver to insert both arms with ease.

The openness of the vertical joints near the ice breaker, from the bottom up almost to the cut stone, is particularly noticeable, and the whole circumstances are such as to lead to the inference that the masonry of the lower portion of the ice breaker has settled down and outward.

*Pier No. 6.*—The riprap, which extends to within 7 feet of low water, slopes off steeply from front of ice breaker around sides of curve.

An overhanging cavity was found in the masonry a little west of the middle of the south side. This is at the base of pier and is about 5 feet high, projecting 2.5 feet, and extending along pier for 12 feet or more.

A little farther along on the south side, near the east end, a cavity was discovered filled in with fine silt. This is about a foot from the bottom, directly under one of the old transverse timbers. The opening on the face of the pier is 10 inches high and 3 feet long, running back into the masonry 8.5 feet or more and spreading out toward the rear to a width of 6 or 7 feet.

Except for one open joint 4 inches wide and 2.5 feet deep near the middle of the south side, about 6 feet below water, the remainder of the pier showed no special defects, the joints being apparently full.

*Pier No. 7.*—As in most of the others the riprap is found only in the upstream end, where, from about 12 feet below water, it slopes abruptly off around the curve.

One extremely wide joint was found near the middle of the north side about 10 feet below water. This is from 6 to 8 inches wide, 6 feet long, and extends into pier from 3 to 5 feet depth.

With this exception the masonry appears to be in fair condition with full joints and no missing stones.

*Pier No. 8.*—Next to pier No. 5, No. 8 seems to be in a worse condition than any of the others.

The riprap, starting on front of ice breaker 12 feet below water line, slopes off steeply around south side of ice breaker, but extends along north side of pier for about two-thirds of its length, where it tapers off.

There is a prominent horizontal projection of the pier footing about 8 feet below water, 2 feet wide on the south side and 6 feet on the north, below which the pier batters outward roughly to the bottom.

On the south side the masonry above the level of this ledge is in fair condition, except along water line, where, as usual, the joints are eroded.

Below the ledge the entire face of the pier is in poor condition. A considerable number of the joints scattered around over the whole area were open sufficiently to permit the insertion of the diver's arm to its full length, and in several of them he was able to shove an iron bar 5 or 6 feet into the masonry.

On the north side two widely open horizontal joints were noticed, a couple of feet above the ledge, near the middle of the pier. These were from 4 to 6 inches wide, nearly 6 feet long, and 1.5 to 2 feet deep.

Below the ledge the masonry was more covered up by riprap than on the other side, but what could be seen of it appeared to be in somewhat better condition, with tolerably full joints, until the northeast corner was reached, where an overhanging cavity was found.

This break is about 8 feet long, 7 feet high, and with 4 feet overhang. In the rear of the cavity are two long open joints several inches wide and extending in some distance.

The river bottom around all of the piers is covered with a deposit of mud, none of the bed rock being exposed. This layer of mud is heavier toward the south shore and thins out toward the north side, where it is not more than 2 or 3 feet thick between piers 7 and 8, many nodules and spurs of rock being found projecting up through it over this area.

Very respectfully,

JOHN MEIGS, Jr., *Inspector.*

FEBRUARY 25, 1901.

I certify that the above is a correct statement and that the conditions set forth are exactly as observed by me.

J. WANNER,
*Submarine Diver, of Washington, D. C.*

Lieut. Col. CHAS. J. ALLEN,
*Corps of Engineers, U. S. A.*

It will be seen that the inspector and the submarine diver in reporting piers 2, 3, and 7 in "good condition," qualify the statement by saying that the adjective (good) is "used in a purely comparative way, and not intended to have any positive value in a modern engineering sense;" also that "piers Nos. 1 and 6, while generally in fair condition, have in them minor cavities of limited extent," and that "piers 5 and 8 are in a condition which can be stated as thoroughly bad, in the case of pier 5 as even dangerously so."

The examination by the diver was as complete as could be made in the time allotted for it. To fully or satisfactorily examine the interior of the piers would require the removal of masonry, and at considerable expense and delay and possible interference with traffic. It would be more satisfactory to, instead, take the piers down altogether and construct a less number of them to support longer spans than now exist. To be making repairs to these old piers from time to time by filling the cavities, as they develop, with concrete in bags or by grouting, pointing joints above low water, propping and sustaining them with deposits of riprap, etc., will never be satisfactory; it will be patchwork of poor material.

Piers 5 and 8 of the bridge, as at present, support ends of four spans, or four-ninths the length of the superstructure. The condition of pier 6 is, to say the least, doubtful. That pier supports the ends of two spans, one of them connecting pier 5. Here we have five-ninths of the length of the superstructure connected with three piers, one doubtful, and two "thoroughly bad." It does not seem necessary to carry the analysis further.

The masonry arches on the Georgetown side, and which are probably the best of the old masonry connected with the bridge, are not such as should form part of a new structure. The four photographs,[1] herewith, taken on the 21st instant, give an idea of their present appearance. While their joints might be pointed with mortar and some other repairs might be made to them, they would still be unsuitable.

Answering the questions contained in the letter of the 15th instant, I would say that the general condition of the piers of the Aqueduct Bridge (and probably of the abutments) is unsatisfactory, and not such as would be tolerated in masonry piers or foundations built to-day to support a public structure. The great size and weight of these old piers, as they now are, of poor masonry, in parts without mortar, may enable them to resist ordinary floods and wear and tear for a time, but for how long no one can predict; there is no certainty that another flood like that of 1889 may not fatally injure several of the old piers. Therefore I would say that, in my opinion, these old piers can not be regarded as safe for sustaining a new superstructure to accommodate street cars, carriages (automobiles included), and foot passengers.

An opinion as to proper action to be taken under these circumstances and an approximate estimate of the cost of a new bridge to replace the present structure is desired.

If increased loads, as are indicated in the letter of 15th instant, are to be carried across the Potomac at the site of the present Aqueduct Bridge, I would respectfully recommend that the bridge be entirely rebuilt (both sub and superstructure) except pier No. 4, which is now in excellent condition, and that to facilitate this end an appropriation of $3,000 be made to defray the expense of examination, by diver, at the north and south abutments and also of examination of the river bed and approaches at and about the line of the bridge, and also for working up plans and estimates to be submitted to Congress. The cost of the examination is placed at about $800, and of the working up of plans and estimates at about $2,200.

There are numerous elements which should be carefully considered before an accurate estimate of the cost of constructing a new and suitable bridge at this site can be made, for the full consideration of which neither time nor funds are available at present. I have, however, had prepared roughly approximate estimates for reconstruction of the bridge. In these estimates it is proposed to remove all the existing piers and abutments, except pier No. 4, and including the arches of the Washington approach which are in bad condition. New piers and abutments to be built of suitable dimensions founded on bed rock at approximately the site of every other one of the existing piers (every alternate pier). This will require 5 spans (steel estimated for) of about 240 feet each and 1 span of about 160 feet, the latter being over the canal. Provision to be made for 2 street railway tracks, as it is believed that one track would eventually prove insufficient. If the bridge be single deck this would require a width of practically 20 feet for the street railway, and a further width of roadway for the passage of other vehicles. Two sidewalks should also be provided. The roadway to be paved with sheet asphalt and the sidewalks to be of granolithic. The clear head room under the trusses and the grade of the roadway are assumed to be practically as at present.

The estimated cost of a bridge—piers and superstructure—of steel spans as just indicated, width of roadway (for cars and carriages) 40 feet, and width of sidewalks 8 feet is, approximately, $860,000.

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[1] Omitted.

If the width of roadway be 44 feet and widths of sidewalks 10 feet, the approximately probable cost would be $940,000.

These estimates might be materially changed if time admitted of thorough and accurate computations.

Provision for maintenance of travel during reconstruction has been considered in making the estimate. There would necessarily be some obstruction to travel, although it would be reduced to the minimum.

The location of the electric railway tracks upon a deck below that designed for ordinary travel is worthy of very careful consideration. The bridge might thus be made narrower, the tracks could readily enter and leave the bridge from berms alongside the approaches, and the congestion of traffic at the intersection of the axis of the bridge with M street might be materially relieved. The cost would probably not differ materially from that of the bridges outlined above.

With this report is a profile[1] of the Aqueduct Bridge to show the positions of the piers; also a sheet of sketches[1] showing the extent to which three of the piers were found eroded in May, 1893.

If time had permitted, a sketch showing the conditions found by the diver during the recent examination would have been inclosed.

Very respectfully, your obedient servant,

Chas. J. Allen,
*Lieut. Col., Corps of Engineers*

Brig. Gen. John M. Wilson,
*Chief of Engineers, U. S. A.*

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United States Engineer Office,
*Washington, D. C., February 27, 1901.*

General: Referring to my report of the 25th instant upon the piers of the Aqueduct Bridge across the Potomac River at Georgetown (381881), I would say that I had a full conversation yesterday with the assistant, Mr. John Meigs, jr., who was inspector of the contract work during the recent reconstruction of pier No. 4 of that bridge, and also with the diver who made the recent examination of the bridge piers, and as a result I requested the inspector to report the amount of material (concrete in bags, etc.) needed to fill the exterior cavities found in piers 1, 5, 6, and 8, in order to afford temporary protection to the piers.

Mr. Meigs (please see copy of his report herewith) estimates that about 25 cubic yards of concrete will be required for the four piers, and also about 125 cubic yards of stone riprap protection.

The cost of the concrete, to be placed by a diver, is estimated at about $30 a cubic yard in place, and of the riprap, in place, about $2.50 per cubic yard.

The total cost of affording the temporary protection referred to is estimated as follows:

| | |
|---|---|
| Concrete, in place | $750.00 |
| Riprap, in place | 312.50 |
| Engineering, superintendence, and contingencies, say | 400.00 |
| | 1,462.50 |

but there is no money available for this protection.

Work under the existing contract for reconstruction of pier No. 4 of this bridge is nearly completed; the masonry has been entirely finished, and about all that remains to be done is the removal of the débris and taking away of the cofferdam. There will remain after the completion of the contract an available balance of the appropriation made for reconstruction of pier No. 4 in act approved June 8, 1896, of probably about $18,000, which it has been our expectation could be covered into the Treasury. If, however, it would be allowable, or Congress should authorize the expenditure of so much of this sum as might be needed for immediate temporary protection of the other piers, for watching, and in case of emergency for any further necessary protective work, the structure could receive attention until the bridge matter should be decided by Congress.

Very respectfully, your obedient servant,

Chas. J. Allen,
*Lieut. Col., Corps of Engineers.*

Brig. Gen. John M. Wilson,
*Chief of Engineers, U. S. A.*

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[1] Omitted.

### LETTER OF MR. JOHN MEIGS, JR., INSPECTOR.

WASHINGTON, D. C., *February 27, 1901.*

COLONEL: The recent examination of the piers of the Aqueduct Bridge by diver developed the fact that some of them are in very bad condition, and the advisability of early repairs to them is apparent.

The cavities, in themselves, are not large enough at present to endanger the actual stability of the piers, but the extent to which and the rapidity with which they may enlarge under the eroding influence of any flood, it is impossible to predict.

These cavities are none of them of very large size, as compared with those repaired in 1894, the largest being of less than 10 cubic yards in content, but the masonry overhanging them is in a decidedly precarious position, the strength of the mortar and the interlocking of the stones with each other alone keeping them in place, and unless some steps are taken to prevent the progress of this undermining process, it may extend indefinitely.

The only practicable way of filling in these holes is by the usual method of concrete in bags placed by a diver and built up by him into a rough semblance of masonry.

The larger cavities, which may be filled in in this way, were found in piers 6 and 8, with smaller ones in piers 1 and 5, the total contents of them being nearly 25 cubic yards.

In the case of pier 5, and in lesser degree pier 8, it is not so much the actual amount of the missing masonry to be considered as it is the general bad condition and apparent looseness of it which is alarming.

It is difficult to see how this condition can be remedied at this late date in any way except by entire reconstruction.

Had the piers been thoroughly riprapped at the time of their construction, it might possibly have prevented the erosion of mortar from the joints, assuming that they were originally full, but at the present time to do this as a protective measure would be of very doubtful utility.

To adequately riprap pier 5, for instance, would require from 800 to 1,000 cubic yards of stone. This method would be deplorable, if followed for all of the piers, in the first place because of the consequent reduction of the already too small cross section of the river at this point, and secondly, as adding considerably to the difficulties of the future repair work which will inevitably have to be done in time.

I would therefore recommend that the cavities in the piers large enough to be treated in this way be filled in with concrete in bags and that only as much riprap as is necessary to cover these repairs be placed around them.

As nearly as I can estimate, this would require about 25 cubic yards of concrete and 125 cubic yards of riprap.

Very respectfully,

JOHN MEIGS, Jr., *Inspector.*

Lieut. Col. CHAS. J. ALLEN,
*Corps of Engineers, U. S. A.*

## B B B 2.

### MEMORIAL BRIDGE ACROSS POTOMAC RIVER AT WASHINGTON, DISTRICT OF COLUMBIA.

There are no operations to report for the year ended June 30, 1901, construction of the bridge not having as yet been authorized by Congress.

The specifications and estimates accompanying the competitive design which was selected as the most suitable (Design No. 2, by Mr. Burr) are full, explicit, and clear. The estimate is as close as can be expected of an advance estimate for a large work of that kind. The plans, sections, profiles, and details (twelve in number) are in good shape for use. In case of an appropriation for this much-needed bridge, there will be nothing, so far as known, to prevent a prompt commencement of the work, including the preparation of materials, special detail drawings, such borings at the precise sites for piers and abutments as a prudent constructor would make, notwithstanding that a full survey, including borings, had previously been made, etc.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $227.24 |
| June 30, 1901, amount expended during fiscal year | 6.54 |
| July 1, 1901, balance unexpended | 220.70 |

# APPENDIX C C C.

## WASHINGTON AQUEDUCT, INCREASING THE WATER SUPPLY OF WASHINGTON, D. C., AND WASHINGTON AQUEDUCT, D. C., FILTRATION PLANT.

### *REPORT OF LIEUT. COL. A. M. MILLER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

OFFICE OF THE WASHINGTON AQUEDUCT,
*Washington, D. C., July 20, 1901.*

GENERAL: I have the honor to forward herewith the annual report for Washington Aqueduct, increasing the water supply of Washington, D. C., and Washington Aqueduct, D. C., filtration plant.

Very respectfully, your obedient servant,

A. M. MILLER,
*Lieut. Col., Corps of Engineers.*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*

## C C C 1.

### WASHINGTON AQUEDUCT.

Appropriations for the Washington Aqueduct are applied to the improvement, maintenance, and repair of all of those parts of the water supply that have been placed under the supervision of the Chief of Engineers, except the new reservoir near Howard University and the tunnel connecting it with the distributing reservoir. These are the masonry dam across the Potomac at Great Falls, the works there for regulating the supply to the conduit, the Conduit road from Great Falls to Washington, a distance of about 14 miles, the conduit from Great Falls to the distributing reservoir, the three reservoirs for supplying the city, the mains for delivering water from the reservoirs into the city's distributing system, and the two bridges for carrying the mains across Rock Creek.

The water supply is taken from the Potomac River at Great Falls, about 14 miles above the city.

At this point a masonry dam extends across the river from the Maryland to the Virginia shore. Its total length is 2,877 feet, and the width of its crest in the Virginia channel and across Conns Island is 8 feet 3 inches and in the Maryland channel 7 feet 9 inches. In 1895–96 the crest of the dam was raised from a reference of 148 feet above mean tide at the Washington Navy-Yard to 150.5 feet above the same datum plane.

The top of the mouth of the feeder of the conduit at Great Falls is at a reference of 149 feet and the bottom at a reference of 139.5 feet.

The water passes from the feeder through the gatehouse and into the conduit, which at this point has a reference of 152 feet at the interior surface of the crown of the arch.

The slope of the conduit is uniform between the gatehouse at Great Falls and the distributing reservoir and is 9 inches in 5,000 feet.

The conduit is circular in cross section, and for the greater part of its entire length is 9 feet in diameter and composed either of rubble masonry plastered or of three rings of brick, but where the soil in which it was built was considered particularly good the inner ring of brick was omitted and the diameter is 9 feet 9 inches. Where the conduit passes as an unlined tunnel through rock, the excavation was sufficient to contain an inscribed circle 11 feet in diameter.

The lengths of the conduit and its connections are as follows:

Length of feeder at Great Falls, 256 feet.

Area of cross section at mouth, 157.45 square feet.

Length of conduit between gatehouse at Great Falls and north connection of Dalecarlia Reservoir, 47,896.5 feet; least diameter, 9 feet.

Length of by-conduit around Dalecarlia Reservoir, 2,730.5 feet; diameter for 625 feet, 8 feet; for rest of distance, 9 feet.

Length of conduit between south connection of the Dalecarlia Reservoir and north connection of the distributing reservoir, 10,149.87 feet; diameter of conduit, 9 feet.

Length of by-conduit around the distributing reservoir, 2,274.35 feet; diameter, 7 feet.

At the distributing reservoir the water passes into 4 cast-iron mains 48 inches, 36 inches, 30 inches, and 12 inches in diameter, respectively.

The Dalecarlia Reservoir has a storage capacity of about 150,000,000 gallons, is practically without paved slope wall, is perfectly protected against pollution from the drainage of the surrounding country, and is provided with a spillway, the reference of the bottom of which is 146.5 feet. The reference of the interior surface of the crown of the arch of the conduit at the north connection of this reservoir is 143.77 feet and at the south connection 143.39 feet. The distance between these points, measured along the line of flow of the water across the reservoir, is about 3,550 feet.

The distributing reservoir has a storage capacity of about 150,850,000 gallons and is divided by a puddled and paved wall, through which is a passageway which can be closed with stop planks, into two sections, containing 97,600,000 and 53,250,000 gallons, respectively.

The interior surface of the crown of the arch of the conduit at the north connection of this reservoir has a reference of 141.87 feet.

The Georgetown high-service reservoir is circular in plan and has an available capacity of about 1,500,000 gallons. The reference of its water surface when the reservoir is full is 220.5 feet. Although this reservoir is under the charge of this office, the duty of keeping it filled by pumping devolved upon the water department of the District of Columbia until it was taken out of service, November 17, 1897, at the request of the Commissioners of the District of Columbia, the Fort Reno reservoir and the pumping service having rendered its further use inadvisable except in case of emergency.

In addition to the three reservoirs already mentioned, which form a part of the aqueduct system, there is another reservoir, built and controlled by the Commissioners of the District of Columbia, called the Fort Reno reservoir, with a capacity of about 4,500,000 gallons, the reference of its water service when the reservoir is full being about 420 feet. This reservoir is supplied with water taken from the supply mains by the U street pump.

The Dalecarlia and distributing reservoirs supply that part of the District which lies below 90 feet above datum. The areas lying between the levels of 90 and 220 feet above datum are supplied by pumping from the U street station directly into the distributing mains, and by the use of the new Brightwood reservoir, built by the Commissioners of the District of Columbia, and having a capacity of 30,000,000 gallons, the Georgetown high-service reservoir being held as a reserve supply. The areas having a greater elevation than 220 feet above datum are supplied from the Fort Reno reservoir.

It will be observed, therefore, that the total present storage capacity of all reservoirs is about 337,000,000 gallons, or about six days' normal supply.

Until the average daily consumption of water becomes considerably greater than at present the reference of the surface of the water at the lowest stage of the Potomac will be about 151 feet at the mouth of the feeder at Great Falls, about 146.75 feet at the Dalecarlia reservoir, and 146 feet at the distributing reservoir.

The total supply of water which the present conduit can safely furnish, without a pressure dangerous to its safety, is 76,000,000 gallons per diem. This, however, necessitates the lowering of the distributing reservoir to reference 144, thus involving a loss of head of 2 feet at that point of distribution.

The following statement shows the operations upon the aqueduct and its accessory works during the fiscal year, and their condition at its close:

### THE DAM AT GREAT FALLS.

Small repairs were made to the riprap backing of the dam.

### GATEHOUSES AND BUILDINGS.

Gatehouses and storehouses were covered with a wash of Portland cement, the inside of the gatehouses whitewashed, and the ironwork of roofs painted.

Small repairs were made to watchmen's houses and the woodwork painted.

### THE RESERVOIRS.

The grounds at all the reservoirs were kept in good order, and the fences around the Dalecarlia and distributing reservoirs were repaired and whitewashed. The channels around the Dalecarlia reservoir were cleaned, and concrete steps were constructed from the Conduit road to the north connection of this reservoir.

The paving on the dividing embankment of the distributing reservoir was repaired where it had settled.

The following table gives the fluctuation from and including the year 1894–95 to date, June 30, 1901, of the level of the water in the distributing reservoir:

| Year. | Lowest | Date. | Highest. | Date. | Range. |
|---|---|---|---|---|---|
| | *Feet.* | | *Feet.* | | *Feet.* |
| 1894-95 | 141.45 | February, 1894 | 145.55 | March, 1895 | 4.1 |
| 1895-96 | 144.15 | July, 1895 | 145.95 | April and May, 1896 | 1.8 |
| 1896-97 | 145.08 | January 30, 1897 | 146.08 | November 29, 1896 | 1 |
| 1897-98 | 145.65 | February 2, 1898 | 146.10 | April 27, 1898 | .45 |
| 1898-99 | 144.55 | February 16, 1899 | 146.05 | April 16, 1899 | 1.5 |
| 1899-1900 | 141.25 | June 27, 1900 | 145.98 | December 27, 1899 | 4.73 |
| 1900-1901 | 141.01 | June 26, 1901 | 145.90 | January 12, 1901 | 4.89 |

### THE CONDUIT AND CONDUIT ROAD.

Gutters, ditches, culverts, and drains were repaired and cleaned.

About 25 cubic yards of deposit were removed from the mouth of the conduit at Great Falls.

All fences along the Conduit road were repaired and whitewashed, and the brush and weeds on the embankments were cut down.

On account of the repairs being made to the by-conduit around the Dalecarlia reservoir, this conduit has been out of service during the year.

The by-conduit of the distributing reservoir has also been out of service on account of the construction of the west shaft gatehouse, with which this by-conduit connects.

Four thousand two hundred and twenty-one cubic yards of flint stone and 686 cubic yards of bluestone were crushed and spread on the Conduit road, and the dirt road between the Club House and Great Falls was repaired.

### THE BRIDGES.

Small repairs were made to the pavement of Bridge No. 3 and Cabin John Bridge, and to the floor of the bridge at the Dalecarlia reservoir. All the bridges are now in excellent condition.

The roadway of Pennsylvania avenue, which in the vicinity is 53.5 feet in the clear width, is contracted on the bridge over Rock Creek to a clear width of but 17 feet, and as drivers are required to walk their teams while passing over the bridge, a congestion of travel results during the busiest hours of the day, causing delay and annoyance, as there is not room for one team to pass another, and consequently the speed of all teams on the bridge moving in the same direction is limited by that of the team in front. Especially is this annoyance felt by the thousands of bicycle riders who daily pass over the bridge and who, unless experienced riders, are frequently forced to dismount and lead their bicycles over the bridge, the rate of progress of the teams blocking the roadway ahead being too slow to allow an inexperienced rider to maintain equilibrium. In addition, the sightly appearance of the avenue is much injured by the extreme contraction at this point.

This bridge, the property of the Washington Aqueduct, is very graceful in appearance and is unique among the bridges of the world, in that the roadway is supported upon arched ribs formed by two 48-inch cast-iron pipes, through which flows at least half of the water consumed by the city. It would seem therefore, that any plan to widen the bridge should preserve both the graceful form and the distinctive features of the bridge.

A board of engineers, constituted by Special Orders, No. 8, February 2, 1877, and composed of the following officers of the United States Corps of Engineers: Bvt. Maj. Gen. Z. B. Tower, Bvt. Maj. Gen. H. G. Wright, and Bvt. Maj. Gen. Q. A. Gillmore, was assembled to examine into the propriety of certain proposed modifications of this bridge. This board, after due consideration of the matter, reported as follows:

> It would, in our opinion, therefore, better accord with the position on Pennsylvania avenue and with the general character and architectural effect of other aqueduct structures to widen this structure, without changing its design, by the addition of two arched iron ribs similar to those of the present bridge and by widening the abutments.
>
> These two arched ribs should be made about as heavy as those of the present bridge. As the previous discussion shows the latter to be abundantly strong without the truss work, in the new construction the greater portion of the whole weight of the bridge could be thrown upon the added arches not used as water pipes.
>
> We regard the arch as far more sightly, beautiful, and architectural than the truss, and therefore more suitable for this position.

On April 26, 1877, the late Gen. Thomas L. Casey, United States Corps of Engineers (retired), then in charge of the Washington Aqueduct, was requested by the Chief of Engineers to investigate and report upon "the present and prospective use of that bridge as a highway, etc." This he did on July 19, 1877, his report concluding with the following opinion:

> I am further of opinion that the present and prospective interests of the citizens of Washington and Georgetown do demand an increase in the width of the roadway and of the footways, the present width being, of the roadway only 17 feet, and of the footways 4½ feet each.
>
> The abundant strength and stiffness of the present bridge, under any statical or moving loads that are likely to be placed upon it, are clearly shown by the investigations of the Board of Engineers, as detailed in its report of April 7, 1877, and I agree with it as to the manner in which the widening of the road and foot ways should be accomplished, should it be decided to increase their width, namely, by the addition of two arched iron ribs, similar to those of the present bridge, and by widening the abutments. The estimated cost of widening the bridge in the manner above stated is $75,000.

While it is believed that the interest and convenience of the citizens of Washington and Georgetown demand the widening of this bridge, yet because the present structure amply suffices for all requirements of the Washington Aqueduct system, and because during the past few years no official complaints regarding the width of the bridge have been made to this office, no estimate is submitted for this work, the estimate for the next fiscal year being confined to those subjects directly affecting the operation of the Washington Aqueduct.

### THE MAINS.

The trunk mains, aggregating 21 miles in length, which lead from the distributing reservoir and supply the distributing system of street mains, were laid by the United States and are under the control of this office, but the distributing mains were laid by the city of Washington and the District of Columbia, and are under the care and control of the Commissioners of the District.

The paving over the water mains at Foundry Branch, which had been washed out, was replaced.

The 30-inch and 48-inch connections with the by-conduit at the distributing reservoir have been out of service during the year, on account of the construction of the west-shaft gatehouse, with which these mains have been connected.

Several small leaks in the joints of the 48-inch main were repaired.

### THE TELEPHONE LINE.

Small repairs were made to the telephone line during the year.

### CONSUMPTION AND WASTE OF WATER.

Measurements of the daily and hourly consumption and waste of water were made on June 25–26, 1901, and a detailed record of the measurements is given in the following table:

*Measurements of the daily and hourly consumption and waste of water.*

[Hourly and total flow from the distributing reservoir for twenty-four hours ending at 7 a. m.]

| Hour. | Outflow per hour, June 25-26, 1901. | Remarks. |
|---|---|---|
|  | *Gallons.* |  |
| 7 a. m. to 8 a. m. | 2,239,094 | City temperature in the shade at 2 p. m. June 25, 90° F.; weather clear. |
| 8 a. m. to 9 a. m. | 2,375,965 |  |
| 9 a. m. to 10 a. m. | 2,372,006 |  |
| 10 a. m. to 11 a. m | 2,229,398 |  |
| 11 a. m. to 12 noon | 2,364,464 |  |
| 12 noon to 1 p. m. | 2,084,300 |  |
| 1 p. m. to 2 p. m | 2,220,188 |  |
| 2 p. m. to 3 p. m | 2,355,404 |  |
| 3 p. m. to 4 p. m | 2,351,888 |  |
| 4 p. m. to 5 p. m | 2,486,501 |  |
| 5 p. m. to 6 p. m | 2,620,384 |  |
| 6 p. m. to 7 p. m | 2,478,503 |  |
| 7 p. m. to 8 p. m | 2,199,742 |  |
| 8 p. m. to 9 p. m | 2,059,362 |  |
| 9 p. m. to 10 p. m | 2,139,647 |  |
| 10 p. m. to 11 p. m | 2,237,408 |  |
| 11 p. m. to 12 midnight | 2,187,466 |  |
| 12 midnight to 1 a. m | 2,184,108 |  |
| 1 a. m. to 2 a. m. | 2,180,823 |  |
| 2 a. m. to 3 a. m. | 1,905,676 |  |
| 3 a. m. to 4 a. m. | 2,039,160 |  |
| 4 a. m. to 5 a. m. | 1,900,756 |  |
| 5 a. m. to 6 a. m. | 2,033,327 |  |
| 6 a. m. to 7 a. m. | 2,570,928 |  |
| Total | 53,960,998 |  |

Measurements of the daily and hourly consumption of water were made each month, and the amounts are given in the following table:

|  |  | Gallons. |
|---|---|---|
| 1900. | July 26–27 | 50,612,683 |
|  | August 28–29 | 51,300,078 |
|  | September 26–27 | 52,512,548 |
|  | October 25–26 | 48,987,212 |
|  | November 27–28 | 48,974,367 |
|  | December 27–28 | 51,130,746 |
| 1901. | January 28–29 | 55,524,005 |
|  | February 26–27 | 53,502,963 |
|  | March 21–22 | 47,922,930 |
|  | April 26–27 | 46,420,121 |
|  | May 28–29 | 48,062,634 |
|  | June 25–26 | 53,960,998 |

or a daily average of 12 measurements of consumption and waste for the fiscal year, 49,075,940 gallons.

The following table gives the daily consumption of water by the District of Columbia as furnished by the Washington Aqueduct:

| Date. | Daily consumption. | Population. | Amount per capita per diem. |
|---|---|---|---|
| | *Gallons.* | | *Gallons.* |
| 1874 | 17,554,848 | [a] 130,182 | 134 |
| 1875 | 21,000,000 | [a] 138,091 | 152 |
| 1876 | 24,177,797 | [a] 146,000 | 165 |
| 1877 | 23,252,932 | [a] 153,909 | 151 |
| 1878 | 24,885,945 | [a] 161,818 | 154 |
| 1879 | 25,947,642 | [a] 169,727 | 153 |
| 1880 | 25,740,138 | [b] 177,638 | 145 |
| 1881 | 26,525,991 | [a] 182,893 | 145 |
| 1882 | 29,727,864 | [a] 187,968 | 158 |
| 1883 | 24,314,715 | [a] 193,133 | 126 |
| 1884 | 24,827,118 | [a] 198,198 | 125 |
| 1885 | 25,219,194 | [c] 203,459 | 124 |
| 1886 | 25,542,476 | [a] 208,358 | 123 |
| 1887 | 26,878,424 | [a] 213,357 | 126 |
| 1888 | 29,115,774 | [a] 218,157 | 133 |
| 1889 | 27,708,779 | [a] 225,309 | 123 |
| 1890 | 35,541,845 | [b] 232,460 | 153 |
| 1891 | 38,594,743 | [a] 248,589 | 155 |
| 1892 | 41,161,780 | [c] 264,618 | 156 |
| 1893 | 46,727,108 | [a] 267,569 | 171 |
| 1894 | 49,162,357 | [c] 270,519 | 182 |
| 1895 | 47,182,681 | [a] 272,677 | 173 |
| 1896 | 44,113,574 | [a] 274,815 | 161 |
| 1897 | 45,467,047 | [c] 276,963 | 163 |
| 1898 | 47,288,733 | [a] 277,548 | 170 |
| 1899 | 50,079,855 | [a] 278,133 | 180 |
| 1900 | 50,897,227 | [b] 278,718 | 183 |
| 1901 | 53,960,998 | [a] 279,293 | 193 |

[a] Estimated. [b] United States census. [c] Police census.

From the above it will be observed that the consumption and waste of water in the District of Columbia for June 26, 1901, was 53,960,998 gallons per diem. This is the largest June measurement ever taken, and estimating the population of the District of Columbia as 279,293, gives a daily per capita consumption and waste of 193 gallons.

Careful and trustworthy investigations and measurements made in various cities in the United States show clearly that a per capita daily consumption of 100 gallons is ample for all domestic, business, and public purposes, and that any considerable increase above this amount must be attributed to waste, due to defective mains and service pipes, defective plumbing, and willful waste.

This extravagant use of water has become a serious menace to the supply of water by the Washington Aqueduct with its present capacity. The capacity of the aqueduct, with a head of 146 feet at the distributing reservoir, a head necessary to keep up the present pressure for the gravity supply, is 50,000,000 gallons per diem. If the level of the distributing reservoir were lowered to 144 feet, the ultimate safe limit of supply is 76,000,000 gallons. This latter involves a loss of head of 2 feet, so that to obtain the same pressure with the supply additional pumping would be required.

The present consumption and waste has also an important bearing on the subject of filtration.

A report on the subject of filtering the water supply of Washington was called for by Congress and submitted by this office on March 28, 1900. (See Senate Document No. 259, Fifty-sixth Congress, first session.) It is probable that the cost of filtration will be about $6 per million gallons, or, at the present rate of consumption, about $300 per day, or $110,000 annually. This is a large charge and can only be reduced by a reduction in consumption.

The existing conditions suggest two remedies, either the reduction of consumption to a reasonable rate, 100 gallons per capita per diem, or the increase of the present supply to keep up with the present unreasonable and extravagant demand of 193 gallons per capita per diem.

The first remedy, the reduction of consumption, can only be accomplished by the introduction of meters. This is a positive and certain method and has been shown by actual experience to be perfectly feasible. However, whenever this subject of the introduction of meters has been brought to the attention of Congress it has failed to meet approval.

Capt. Edward Burr, Corps of Engineers, U. S. A., when in charge of the water department of the District of Columbia, made an able and exhaustive report on this subject. (See Report of the Commissioners of the District of Columbia for the fiscal year ending June 30, 1897, Vol. II, p. 181 et seq.)

Captain Burr says (pp. 189-191):

A résumé of the above figures as to per capita use of water is—

| | Gallons. |
|---|---|
| For domestic purposes, 27, or, say | 30 |
| For commercial and United States purposes, 27, or, say | 30 |
| For sprinkling (maximum), 12, or, say | 15 |
| Total maximum legitimate use | 75 |

Add for waste, not deliberate or willful, 25 gallons, and the total is 100 gallons per capita, or 28,000,000 gallons a day. With such an allowance and supply of water there would be ample for all purposes—domestic, commercial, and public. There would be no necessity for stinting or economy in any legitimate use of water. All that is necessary is the suppression of careless, deliberate, and willful waste, due to defective plumbing, known or unknown, and positive personal violations of regulations in opening fixtures to allow water to run continuously.

There is but one means to fully control and suppress such waste—the general extension of the meter system to all classes of consumers, domestic as well as commercial. Until this means is adopted periodical shortages in the water supply of this city must be expected, not because the supply of water is insufficient for all legitimate uses, but because 70 per cent of it is wasted and serves no good end whatever.

That the general introduction of meters will accomplish this end without hardship, increased cost to consumers, insanitary conditions, or any curtailment of the proper use of water, there can be no doubt. The opinion of all authorities and the experience of all communities where the meter system has been generally introduced lead to this belief. By the use of meters is obtained a suppression of waste, a uniformity of water rates according to the amount of water used or wasted, and an increase of pressure, with a general improvement of the service without the expenditure of large sums for enlargements of works.

To illustrate the benefits of the meter system it is necessary to refer to but one city, Detroit, with about the same population as the District of Columbia. The following quotations are taken from a statement made by Mr. L. N. Case, superintendent of the Detroit waterworks, before a committee of the legislature of the State of Michigan, having under consideration what is known as the "free-water bill" for Detroit:

"There has been found but one really efficient restriction to waste, and that is the meter, although assessing upon the basis of consumption as estimated is partially so. * * *

"For years, and up to 1889, Detroit, Buffalo, and Philadelphia operated upon the assessment plan entirely. Detroit pumped a daily per capita supply of 204 gallons. Our capacity was more than exhausted, and complaints of short supplies were bitter and increasing. March 6, 1889, I demonstrated to the board that meters must be used to stop this enormous waste or an enlargement of the works entered into immediately at an estimated expense of $600,000.

"The introduction of meters was decided upon. The following conditions of the three cities in 1887 and 1896 will show the results of the introduction of meters in Detroit and the continuance of the old method in Buffalo and Philadelphia:

*Daily pumpage, in million gallons.*

| | Buffalo. | Philadelphia. | Detroit. |
|---|---|---|---|
| 1887 | 28 | 88 | 76 |
| 1896 | 101 | 239 | 76 |
| Increase in population ... per cent.. | 34 | 46 | 56 |

"Detroit, at the same rate of increase as Buffalo and Philadelphia, which corresponded exactly with her increase previous to using meters, would have pumped 101,000,000 gallons daily. This would have required an expenditure of over $200,000 for engines and pipes more than was expended, and an extra expense for pumping water of $94,900 for last year, with a proportionate increase for the intervening years."

* * * * * * *

One-third increased pressures!

The result in Detroit is a stationary total consumption for ten years, with a 56 per cent increase in population and a per capita decrease from 203 to 130 gallons. This was accomplished by metering about 5,000 consumers of a total of 49,000, and while the effect is marked the per capita supply still shows large waste that can be reduced by increasing the number of meters.

In this city (Washington) the increase in the use of meters has produced a similar but no less marked effect. The existing law requires the use of meters only by hotels, livery stables, manufacturing establishments, and other large consumers. Since 1894 all such consumers have been required to use meters. The following table shows the result:

| | 1894. | 1895. | 1896. | 1897. |
|---|---|---|---|---|
| Number of premises supplied | 44,185 | 45,675 | 46,908 | 48,540 |
| Number of meters | 202 | 231 | 574 | 777 |
| Water supplied ... gallons.. | 49,162,000 | 47,182,000 | 44,114,000 | 45,267,000 |
| Per capita ... do.... | 181 | 173 | 165 | 164 |

With an increase since 1894 of 4,355 in the number of premises supplied with water, the total daily supply is reduced by about 4,000,000 gallons and the per capita supply from 181 to 164 gallons.

This can be attributed to no other cause than to the metering of about 500 large consumers of the character mentioned above.

The introduction of meters will not prevent an abundant supply for all purposes, will result in a less water rate or expense to consumers, and would throw the burden of waste where it belongs, on the shoulders of the careless and willfully negligent consumers.

The second remedy is an increase of the water supply to meet future demands at the present extravagant rate of consumption.

This involves the building of a second conduit from the Great Falls of the Potomac, with the necessary reservoirs, if any, and proper gatehouses and operating plant. In order that this subject may have proper consideration, with due deliberation and prevision, a survey of practicable routes is essential. These surveys should be taken in hand at once, and an estimate for such surveys is submitted with this report.

### PROTECTION TO INLET AT GREAT FALLS.

This work consisted in building a rubble masonry wall just inside the Government line and along the bank of the Chesapeake and Ohio

Canal, extending upriver from the feeder as far as the limit of the Government land (150 feet), and thence at about a right angle and still on the United States land to the shore of the river, a distance of about 100 feet, and also 120 feet of wall along the river bank.

These walls, which contained 489 cubic yards of rubble masonry, the filling back of the walls, and the grading of the Government lot have all been completed.

### REPAIRING BY-CONDUIT.

This work consisted in constructing a one-ring brick lining inside the old rubble masonry conduit in that portion of the conduit between the north connection and the tunnel, and grouting a portion of the old rubble masonry conduit between the tunnel and the south connection.

In doing this work it was necessary to uncover portions of the conduit and cut through the arch for the purpose of pumping out leakage and handling materials.

The following amount of work was done:

| | |
|---|---|
| Excavation and back filling over conduit.........................cubic yards.. | 801 |
| Conduit lined with brick ...............................................feet.. | 698 |
| Concrete filling back of brickwork...............................cubic yards.. | 6 |
| Rubble masonry filling back of brickwork ...............................do.... | 42 |
| Grouting old conduit ....................................barrels of cement.. | 200 |

It is expected that the new reservoir near Howard University will be put in service in October, 1901. This will necessitate the employment of three additional watchmen and three additional laborers (to be employed continuously) and a large amount of labor in the maintenance and preservation of the 4 miles of tunnel, together with the shafts, gatehouses, valves, sluice gates, etc., which will have been added to the aqueduct system. The sum of $25,000 has for several years been asked for for the preservation, repair, and maintenance of the aqueduct system (including the Conduit road), and to this amount, which is most urgently needed, should be added $8,000 to provide for the new work now annexed to the Washington Aqueduct by the completion of the work on the increase of the Washington water supply.

### STOREHOUSE AND STABLE AT GREAT FALLS.

A suitable storehouse and stable should be erected at Great Falls for the storage of tools and implements belonging to the United States and the stabling of the watchman's horses, which are a necessity to him for the proper performance of his duties. For this an estimate of $3,000 is submitted.

### ESTIMATES.

| | |
|---|---|
| For building combined storehouse and stable at Great Falls ................. | $3,000 |
| For preliminary surveys for additional conduit from Great Falls............ | 8,000 |
| For operation, maintenance, repair, etc., of the aqueduct and its accessories, including the Conduit road, the new reservoir, and the Washington Aqueduct tunnel ............................................................ | 33,000 |
| Total ................................................................. | 44,000 |

## *Money statements.*

### WASHINGTON AQUEDUCT, D. C., 1901.

| | |
|---|---|
| Amount appropriated by act of June 6, 1900 | $22,000.00 |
| June 30, 1901, amount expended during fiscal year | 19,242.35 |
| July 1, 1901, balance unexpended | 2,757.65 |
| July 1, 1901, outstanding liabilities | 2,757.65 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903 | 33,000.00 |

### WASHINGTON AQUEDUCT, D. C., 1901: PROTECTION TO INLET AT GREAT FALLS.

| | |
|---|---|
| Amount appropriated by act June 6, 1900 | $5,000.00 |
| June 30, 1901, amount expended during fiscal year | 3,184.44 |
| July 1, 1901, balance unexpended | 1,815.56 |
| July 1, 1901, outstanding liabilities | 701.79 |
| July 1, 1901, balance reverted to Treasury | 1,113.77 |

### WASHINGTON AQUEDUCT, D. C., 1901: REPAIRING BY-CONDUIT.

| | |
|---|---|
| Amount appropriated by act June 6, 1900 | $10,000.00 |
| June 30, 1901, amount expended during fiscal year | 8,803.09 |
| July 1, 1901, balance unexpended | 1,196.91 |
| July 1, 1901, outstanding liabilities | 836.66 |
| July 1, 1901, balance reverted to Treasury | 360.25 |

*Appropriations made for the Washington Aqueduct, with the dates of acts for the same.*

| Date. | Amount. | Date. | Amount. | Date. | Amount. |
|---|---|---|---|---|---|
| September 30, 1850 | $500 | June 10, 1872 | $70,555 | March 3, 1887 | $20,000 |
| August 31, 1852 *a* | 5,000 | January 23, 1873 | 14,000 | July 18, 1888 *h* | 20,000 |
| March 3, 1853 | 100,000 | March 3, 1873 *c* | 43,600 | March 2, 1889 *i* | 20,000 |
| March 3, 1855 | 250,000 | June 23, 1874 *d* | 36,400 | August 6, 1890 *j* | 25,500 |
| August 18, 1856 | 250,000 | March 3, 1875 | 26,000 | March 3, 1891 *k* | 20,000 |
| March 3, 1857 | 1,000,000 | July 31, 1876 | 22,000 | July 14, 1892 | 20,000 |
| June 12, 1858 | 800,000 | March 3, 1877 | 15,000 | March 3, 1893 | 80,000 |
| June 25, 1860 | 500,000 | June 20, 1878 | 15,000 | August 7, 1894 *m* | 82,500 |
| July 4, 1864 | 150,000 | March 3, 1879 *e* | 20,000 | March 2, 1895 *n* | 71,500 |
| July 28, 1866 | 142,584 | June 4, 1880 *f* | 20,000 | June 11, 1896 *o* | 25,000 |
| December 20, 1866 | 12,000 | March 3, 1881 | 20,000 | March 3, 1897 *p* | 26,000 |
| March 2, 1867 | 20,000 | July 1, 1882 *g* | 20,000 | June 30, 1898 | 22,000 |
| July 25, 1868 | 52,500 | March 3, 1883 | 20,000 | March 3, 1899 | 25,000 |
| March 3, 1869 | 25,000 | July 5, 1884 | 20,000 | June 6, 1900 *q* | 87,000 |
| July 15, 1870 *b* | 120,822 | February 25, 1885 | 20,000 | | |
| March 3, 1871 | 114,196 | July 9, 1886 | 20,000 | Total | 4,439,657 |

NOTE.—Reverted to the Treasury: (*a*) $2.81, (*b*) $46.25, (*c*) $560.87, (*d*) 35 cents, (*e*) $1,109.87, (*f*) $381.06, (*g*) $1,354.17, (*h*) $2,266.34, (*i*) $4.12, (*j*) $5,500, (*k*) $2.49, (*m*) $39.96, (*n*) $2,983.87, (*o*) $285.85, (*p*) $1,828.53, $4.38 from regular appropriation for Washington Aqueduct, $1,824.15 from appropriation for constructing telephone line, and (*q*) $1,474.02 from appropriations for protection to inlet at Great Falls and repairing by-conduit; total, $17,840.56. Since 1878 one-half of the amounts appropriated has been contributed by the United States and the other half by the District of Columbia.

## APPENDIX 1.

### CONDITION OF THE WATER DURING THE YEAR.

*Condition of the water at Great Falls, Dalecarlia Reservoir and distributing reservoir, and height of water over dam at Great Falls for each day during the year.*

| Day of month. | Condition of water. | | | Height of water over dam at Great Falls (feet). | Day of month. | Condition of water. | | | Height of water over dam at Great Falls (feet). | Day of month. | Condition of water. | | | Height of water over dam at Great Falls (feet). |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Great Falls. | Dalecarlia receiving reservoir, south connection. | Distributing reservoir effluent gatehouse. | | | Great Falls. | Dalecarlia receiving reservoir, south connection. | Distributing reservoir effluent gatehouse. | | | Great Falls. | Dalecarlia receiving reservoir, south connection. | Distributing reservoir effluent gatehouse. | |
| 1900. | | | | | 1900. | | | | | 1900. | | | | |
| July 1... | 36 | 36 | 32 | 0.90 | Aug. 30... | 36 | 36 | 36 | 0.70 | Oct. 29... | 36 | 36 | 36 | 0.70 |
| 2... | 36 | 36 | 36 | .90 | 31... | 36 | 36 | 36 | .70 | 30... | 36 | 36 | 36 | .70 |
| 3... | 36 | 36 | 36 | .90 | Sept. 1... | 36 | 36 | 36 | .70 | 31... | 36 | 36 | 36 | .60 |
| 4... | 36 | 36 | 36 | .80 | 2... | 36 | 36 | 36 | .70 | Nov. 1... | 36 | 36 | 36 | .60 |
| 5... | 36 | 36 | 36 | .80 | 3... | 36 | 36 | 36 | .70 | 2... | 36 | 36 | 36 | .60 |
| 6... | 36 | 36 | 36 | .80 | 4... | 36 | 36 | 36 | .70 | 3... | 36 | 36 | 36 | .60 |
| 7... | 36 | 36 | 36 | .90 | 5... | 36 | 36 | 36 | .60 | 4... | 36 | 36 | 36 | 1.00 |
| 8... | 1 | 36 | 36 | .80 | 6... | 36 | 36 | 36 | .60 | 5... | 36 | 36 | 36 | .60 |
| 9... | 12 | 36 | 36 | .80 | 7... | 36 | 36 | 36 | .60 | 6... | 36 | 36 | 36 | .60 |
| 10... | 36 | 4 | 36 | .70 | 8... | 36 | 36 | 36 | .60 | 7... | 36 | 36 | 36 | .60 |
| 11... | 36 | 6 | 24 | .70 | 9... | 36 | 36 | 36 | .60 | 8... | 36 | 36 | 36 | .60 |
| 12... | 36 | 10 | 22 | .70 | 10... | 36 | 36 | 36 | .60 | 9... | 36 | 36 | 36 | .60 |
| 13... | 36 | 27 | 27 | .60 | 11... | 36 | 36 | 36 | .60 | 10... | 36 | 36 | 36 | .60 |
| 14... | 36 | 36 | 27 | .60 | 12... | 36 | 36 | 36 | .50 | 11... | 36 | 36 | 36 | .60 |
| 15... | 36 | 36 | 36 | .60 | 13... | 36 | 36 | 36 | .50 | 12... | 36 | 36 | 36 | .60 |
| 16... | 36 | 36 | 36 | .60 | 14... | 36 | 36 | 36 | .50 | 13... | 36 | 36 | 36 | .60 |
| 17... | 36 | 36 | 36 | .60 | 15... | 36 | 36 | 36 | .50 | 14... | 36 | 36 | 36 | .60 |
| 18... | 36 | 36 | 36 | .60 | 16... | 34 | 36 | 36 | .50 | 15... | 36 | 36 | 36 | .60 |
| 19... | 36 | 36 | 36 | .60 | 17... | 33 | 36 | 36 | .60 | 16... | 36 | 36 | 36 | .60 |
| 20... | 36 | 36 | 36 | .60 | 18... | 36 | 36 | 36 | .60 | 17... | 36 | 36 | 36 | .60 |
| 21... | 4 | 36 | 36 | .90 | 19... | 36 | 35 | 36 | .60 | 18... | 36 | 36 | 36 | .60 |
| 22... | 1 | 36 | 36 | .79 | 20... | 36 | 36 | 36 | .50 | 19... | 36 | 36 | 36 | .60 |
| 23... | 1 | 3 | 36 | .70 | 21... | 36 | 36 | 36 | .50 | 20... | 36 | 36 | 36 | .60 |
| 24... | 1 | 1 | 23 | .80 | 22... | 36 | 36 | 36 | .50 | 21... | 36 | 36 | 36 | .60 |
| 25... | 3 | 1 | 8 | 1.00 | 23... | 36 | 36 | 36 | .50 | 22... | 36 | 36 | 36 | .60 |
| 26... | 4 | 2 | 5 | 1.00 | 24... | 36 | 36 | 36 | .50 | 23... | 36 | 36 | 36 | .60 |
| 27... | 1 | 3 | 5 | 1.30 | 25... | 36 | 36 | 36 | .50 | 24... | 36 | 36 | 36 | .60 |
| 28... | 1 | 2 | 5 | 1.00 | 26... | 36 | 36 | 36 | .50 | 25... | 36 | 36 | 36 | .60 |
| 29... | 1 | 2 | 5 | .90 | 27... | 36 | 36 | 36 | .50 | 26... | 36 | 36 | 36 | .60 |
| 30... | 2 | 1 | 1 | .80 | 28... | 36 | 36 | 36 | .50 | 27... | 1 | 36 | 36 | 1.20 |
| 31... | 4 | 1 | 4 | .90 | 29... | 31 | 36 | 36 | .50 | 28... | 1 | 24 | 36 | 2.70 |
| Aug. 1... | 9 | 2 | 3 | .90 | 30... | 23 | 36 | 36 | .60 | 29... | 1 | 2 | 23 | 1.30 |
| 2... | 14 | 6 | 3 | .60 | Oct. 1... | 19 | 21 | 36 | .60 | 30... | 1 | 2 | 5 | 1.60 |
| 3... | 25 | 10 | 4 | .80 | 2... | 23 | 26 | 36 | .60 | Dec. 1... | 1 | 1 | 5 | 1.10 |
| 4... | 31 | 20 | 7 | .80 | 3... | 29 | 30 | 36 | .60 | 2... | 1 | 1 | 4 | 1.10 |
| 5... | 31 | 20 | 16 | .80 | 4... | 34 | 28 | 36 | .60 | 3... | 1 | 1 | 3 | 1.10 |
| 6... | 36 | 30 | 21 | .70 | 5... | 34 | 36 | 36 | .50 | 4... | 3 | 3 | 3 | 1.00 |
| 7... | 36 | 36 | 27 | .70 | 6... | 36 | 36 | 36 | .50 | 5... | 1 | 2 | 4 | 1.40 |
| 8... | 36 | 36 | 36 | .70 | 7... | 36 | 36 | 36 | .50 | 6... | 1 | 1 | 3 | 2.80 |
| 9... | 36 | 36 | 36 | .60 | 8... | 36 | 36 | 36 | .50 | 7... | 1 | 1 | 4 | 2.80 |
| 10... | 36 | 36 | 36 | .60 | 9... | 36 | 36 | 36 | .50 | 8... | 1 | 1 | 4 | 1.70 |
| 11... | 36 | 36 | 36 | .60 | 10... | 36 | 36 | 36 | .50 | 9... | 1 | 1 | 3 | 1.50 |
| 12... | 36 | 36 | 36 | .60 | 11... | 36 | 36 | 36 | .50 | 10... | 2 | 2 | 4 | 1.40 |
| 13... | 36 | 36 | 23 | .60 | 12... | 36 | 36 | 36 | .50 | 11... | 4 | 4 | 3 | 1.30 |
| 14... | 36 | 36 | 36 | .50 | 13... | 36 | 36 | 36 | .50 | 12... | 7 | 6 | 4 | 1.20 |
| 15... | 36 | 36 | 36 | .60 | 14... | 36 | 36 | 36 | .50 | 13... | 12 | 6 | 4 | 1.10 |
| 16... | 36 | 36 | 36 | .90 | 15... | 36 | 36 | 36 | .70 | 14... | 19 | 8 | 5 | 1.10 |
| 17... | 36 | 36 | 36 | .50 | 16... | 36 | 36 | 36 | .60 | 15... | 22 | 10 | 5 | 1.00 |
| 18... | 36 | 36 | 36 | .50 | 17... | 36 | 36 | 36 | .60 | 16... | 29 | 13 | 5 | 1.00 |
| 19... | 36 | 36 | 36 | .50 | 18... | 36 | 36 | 36 | .60 | 17... | 30 | 18 | 5 | 1.00 |
| 20... | 36 | 36 | 36 | .50 | 19... | 36 | 36 | 36 | .60 | 18... | 30 | 24 | 7 | 1.00 |
| 21... | 36 | 36 | 36 | .60 | 20... | 36 | 36 | 36 | .60 | 19... | 30 | 28 | 13 | .80 |
| 22... | 36 | 36 | 36 | .60 | 21... | 36 | 36 | 36 | .60 | 20... | 31 | 28 | 17 | .80 |
| 23... | 36 | 36 | 36 | .60 | 22... | 36 | 36 | 36 | .60 | 21... | 32 | 30 | 21 | .90 |
| 24... | 36 | 36 | 36 | .60 | 23... | 36 | 36 | 36 | .60 | 22... | 36 | 36 | 27 | .80 |
| 25... | 36 | 36 | 36 | .60 | 24... | 36 | 36 | 36 | .60 | 23... | 36 | 36 | 30 | .80 |
| 26... | 36 | 36 | 36 | .60 | 25... | 36 | 36 | 36 | .60 | 24... | 36 | 36 | 32 | .80 |
| 27... | 36 | 36 | 36 | .60 | 26... | 36 | 36 | 36 | .60 | 25... | 36 | 36 | 36 | .80 |
| 28... | 36 | 36 | 36 | .60 | 27... | 36 | 36 | 36 | .60 | 26... | 36 | 36 | 36 | .80 |
| 29... | 36 | 36 | 36 | .70 | 28... | 36 | 36 | 36 | .70 | 27... | 36 | 36 | 36 | .80 |

*Condition of the water at Great Falls, Dalecarlia Reservoir and distributing reservoir, and height of water over dam at Great Falls for each day during the year*—Continued.

| Day of month. | Condition of water. | | | Height of water over dam at Great Falls (feet). |
|---|---|---|---|---|
| | Great Falls. | Dalecarlia receiving reservoir, south connection. | Distributing reservoir effluent gatehouse. | |
| 1900. | | | | |
| Dec. 28... | 36 | 36 | 36 | .80 |
| 29... | 36 | 36 | 36 | .80 |
| 30... | 36 | 36 | 36 | .70 |
| 31... | 36 | 36 | 36 | .80 |
| 1901. | | | | |
| Jan. 1... | 36 | 36 | 36 | .80 |
| 2... | 36 | 36 | 36 | .80 |
| 3... | 36 | 36 | 36 | .70 |
| 4... | 36 | 36 | 36 | .70 |
| 5... | 36 | 36 | 36 | .70 |
| 6... | 36 | 36 | 36 | .70 |
| 7... | 36 | 36 | 36 | .70 |
| 8... | 35 | 36 | 36 | .70 |
| 9... | 36 | 36 | 36 | .70 |
| 10... | 36 | 36 | 36 | .70 |
| 11... | 36 | 36 | 36 | .70 |
| 12... | 4 | 36 | 36 | 1.10 |
| 13... | 1 | 36 | 36 | 1.20 |
| 14... | 1 | 20 | 36 | 1.30 |
| 15... | 1 | 10 | 36 | 1.80 |
| 16... | 4 | 5 | 27 | 1.50 |
| 17... | 9 | 2 | 16 | 1.40 |
| 18... | 4 | 2 | 10 | 1.30 |
| 19... | 6 | 3 | 7 | 1.20 |
| 20... | 7 | 3 | 5 | .80 |
| 21... | 6 | 5 | 5 | 1.10 |
| 22... | 9 | 6 | 6 | 1.00 |
| 23... | 9 | 7 | 5 | 1.00 |
| 24... | 19 | 8 | 5 | 1.00 |
| 25... | 23 | 12 | 7 | 1.00 |
| 26... | 26 | 18 | 8 | 1.50 |
| 27... | 10 | 20 | 10 | 1.00 |
| 28... | 25 | 17 | 13 | 1.20 |
| 29... | 28 | 22 | 14 | 1.40 |
| 30... | 23 | 24 | 16 | .90 |
| 31... | 34 | 26 | 18 | .90 |
| Feb. 1... | 23 | 31 | 23 | .90 |
| 2... | 34 | 36 | 27 | .90 |
| 3... | 36 | 36 | 31 | .80 |
| 4... | 36 | 36 | 34 | .90 |
| 5... | 18 | 36 | 36 | 1.20 |
| 6... | 22 | 36 | 36 | .80 |
| 7... | 27 | 36 | 36 | .70 |
| 8... | 29 | 36 | 36 | .90 |
| 9... | 36 | 36 | 36 | .90 |
| 10... | 36 | 36 | 36 | .80 |
| 11... | 36 | 36 | 36 | .80 |
| 12... | 36 | 36 | 36 | .80 |
| 13... | 30 | 36 | 36 | .50 |
| 14... | 36 | 36 | 36 | .50 |
| 15... | 36 | 36 | 36 | .60 |
| 16... | 36 | 36 | 36 | .70 |
| 17... | 36 | 36 | 36 | .80 |
| 18... | 35 | 36 | 36 | .80 |
| 19... | 36 | 36 | 36 | .80 |
| 20... | 36 | 36 | 36 | .90 |
| 21... | 36 | 36 | 36 | 1.20 |
| 22... | 23 | 36 | 36 | .70 |
| 23... | 25 | 36 | 36 | .60 |
| 24... | 36 | 36 | 36 | .70 |
| 25... | 36 | 36 | 36 | .70 |
| 26... | 36 | 36 | 36 | .80 |
| 1901. | | | | |
| Feb. 27... | 36 | 36 | 36 | .70 |
| 28... | 36 | 36 | 36 | .70 |
| Mar. 1... | 36 | 36 | 36 | .80 |
| 2... | 36 | 36 | 36 | .80 |
| 3... | 36 | 36 | 36 | .80 |
| 4... | 36 | 36 | 36 | .80 |
| 5... | 36 | 36 | 36 | .80 |
| 6... | 36 | 36 | 36 | .90 |
| 7... | 36 | 36 | 36 | .80 |
| 8... | 25 | 36 | 36 | 1.00 |
| 9... | 19 | 36 | 36 | 1.10 |
| 10... | 20 | 36 | 36 | 1.10 |
| 11... | 20 | 36 | 36 | 1.10 |
| 12... | 1 | 36 | 36 | 3.80 |
| 13... | 1 | 5 | 31 | 3.70 |
| 14... | 1 | 2 | 8 | 2.60 |
| 15... | 2 | 1 | 3 | 2.10 |
| 16... | 3 | 1 | 2 | 1.90 |
| 17... | 4 | 1 | 2 | 1.70 |
| 18... | 9 | 2 | 2 | 1.50 |
| 19... | 9 | 2 | 2 | 1.40 |
| 20... | 9 | 1 | 2 | 1.30 |
| 21... | 6 | 4 | 2 | 1.30 |
| 22... | 1 | 5 | 2 | 1.60 |
| 23... | 1 | 1 | 3 | 1.50 |
| 24... | 3 | 2 | 3 | 1.60 |
| 25... | 4 | 2 | 3 | 1.60 |
| 26... | 7 | 3 | 3 | 1.40 |
| 27... | 10 | 3 | 3 | 1.50 |
| 28... | 1 | 4 | 3 | 1.60 |
| 29... | 1 | 2 | 3 | 1.40 |
| 30... | 3 | 1 | 3 | 1.40 |
| 31... | 7 | 1 | 2 | 1.40 |
| Apr. 1... | 11 | 1 | 2 | 1.30 |
| 2... | 6 | 2 | 2 | 1.30 |
| 3... | 3 | 3 | 2 | 1.50 |
| 4... | 1 | 3 | 2 | 2.50 |
| 5... | 1 | 2 | 2 | 2.90 |
| 6... | 2 | 2 | 2 | 1.70 |
| 7... | 3 | 2 | 3 | 2.50 |
| 8... | 4 | 1 | 3 | 2.70 |
| 9... | 4 | 2 | 3 | 1.60 |
| 10... | 5 | 3 | 3 | 2.40 |
| 11... | 5 | 3 | 4 | 2.00 |
| 12... | 5 | 4 | 5 | 1.70 |
| 13... | 13 | 6 | 8 | 1.60 |
| 14... | 14 | 7 | 8 | 1.60 |
| 15... | 2 | 7 | 10 | 2.50 |
| 16... | 1 | 5 | 11 | 4.50 |
| 17... | 1 | 3 | 14 | 3.30 |
| 18... | 2 | 4 | 10 | 2.50 |
| 19... | 5 | 2 | 8 | 2.40 |
| 20... | 5 | 2 | 4 | 2.20 |
| 21... | 7 | 2 | 3 | 2.50 |
| 22... | 1 | 3 | 4 | 5.10 |
| 23... | 1 | 3 | 3 | 5.30 |
| 24... | 2 | 3 | 3 | 3.60 |
| 25... | 3 | 2 | 3 | 3.00 |
| 26... | 5 | 1 | 3 | 2.60 |
| 27... | 6 | 2 | 3 | 2.30 |
| 28... | 11 | 3 | 3 | 2.10 |
| 29... | 13 | 4 | 4 | 1.90 |
| 1901. | | | | |
| Apr. 30... | 15 | 7 | 3 | 1.60 |
| May 1... | 16 | 9 | 5 | 1.50 |
| 2... | 18 | 9 | 5 | 1.50 |
| 3... | 26 | 10 | 9 | 1.40 |
| 4... | 28 | 18 | 12 | 1.40 |
| 5... | 29 | 21 | 16 | 1.40 |
| 6... | 33 | 27 | 22 | 1.30 |
| 7... | 35 | 31 | 27 | 1.20 |
| 8... | 36 | 33 | 30 | 1.20 |
| 9... | 36 | 36 | 36 | 1.20 |
| 10... | 36 | 36 | 36 | 1.10 |
| 11... | 28 | 36 | 36 | 1.10 |
| 12... | 1 | 36 | 36 | 1.20 |
| 13... | 1 | 17 | 36 | 1.40 |
| 14... | 1 | 6 | 36 | 1.90 |
| 15... | 2 | 4 | 14 | 1.70 |
| 16... | 5 | 4 | 7 | 1.50 |
| 17... | 13 | 4 | 4 | 1.40 |
| 18... | 13 | 6 | 4 | 1.30 |
| 19... | 16 | 8 | 5 | 1.20 |
| 20... | 25 | 12 | 8 | 1.20 |
| 21... | 27 | 14 | 9 | 1.10 |
| 22... | 33 | 15 | 11 | 1.10 |
| 23... | 9 | 4 | 14 | 2.00 |
| 24... | 1 | 16 | 22 | 4.50 |
| 25... | 1 | 5 | 23 | 3.50 |
| 26... | 1 | 3 | 14 | 2.90 |
| 27... | 1 | 2 | 7 | 2.50 |
| 28... | 1 | 2 | 5 | 2.70 |
| 29... | 1 | 2 | 5 | 3.00 |
| 30... | 1 | 2 | 3 | 3.20 |
| 31... | 1 | 3 | 3 | 3.20 |
| June 1... | 2 | 2 | 3 | 2.70 |
| 2... | 6 | 3 | 4 | 2.40 |
| 3... | 6 | 6 | 3 | 2.10 |
| 4... | 9 | 5 | 5 | 1.80 |
| 5... | 13 | 7 | 4 | 1.70 |
| 6... | 17 | 8 | 6 | 1.50 |
| 7... | 4 | 9 | 10 | 1.50 |
| 8... | 2 | 8 | 13 | 1.80 |
| 9... | 2 | 4 | 15 | 1.90 |
| 10... | 4 | 4 | 13 | 1.70 |
| 11... | 4 | 1 | 11 | 1.50 |
| 12... | 7 | 4 | 9 | 1.40 |
| 13... | 13 | 5 | 9 | 1.30 |
| 14... | 1 | 6 | 8 | 1.60 |
| 15... | 1 | 6 | 9 | 1.50 |
| 16... | 1 | 2 | 7 | 1.40 |
| 17... | 1 | 1 | 6 | 2.40 |
| 18... | 1 | 1 | 4 | 3.70 |
| 19... | 1 | 1 | 4 | 2.40 |
| 20... | 1 | 2 | 4 | 2.00 |
| 21... | 2 | 2 | 4 | 1.80 |
| 22... | 5 | 2 | 4 | 1.70 |
| 23... | 4 | 3 | 9 | 2.00 |
| 24... | 1 | 3 | 5 | 2.10 |
| 25... | 1 | 4 | 3 | 1.80 |
| 26... | 1 | 3 | 3 | 1.50 |
| 27... | 1 | 2 | 3 | 1.40 |
| 28... | 4 | 2 | 3 | 1.30 |
| 29... | 6 | 3 | 3 | 1.40 |
| 30... | 8 | 4 | 3 | 1.40 |

According to the scale for recording the condition of the water as regards clearness, the numbers 0 to 7 inclusive, correspond to very turbid; 8 to 14 turbid; 15 to 21 slightly turbid; and 22 to 36 clear. The following table shows the condition of the water at various parts of the system during the year:

| Condition. | Number of days when this condition existed at— | | |
|---|---|---|---|
| | Great Falls. | Dalecarlia reservoir, effluent gatehouse. | Distributing reservoir, effluent gatehouse. |
| Very turbid | 117 | 125 | 107 |
| Turbid | 24 | 17 | 32 |
| Slightly turbid | 11 | 12 | 9 |
| Clear | 218 | 211 | 217 |
| Total | 365 | 365 | 365 |

*Daily gauge pressures at the office of the Washington Aqueduct at 9 o'clock a. m.*

| Month. | Main. | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. | 20. | 21. | 22. | 23. | 24. | 25. | 26. | 27. | 28. | 29. | 30. | 31. | Average. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1900. | *Inch.* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| July | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31.00 |
| | 48 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37.00 |
| August | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31.00 |
| | 48 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37.00 |
| September | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | .... | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | .... | 31.00 |
| | 48 | 36 | 37 | 37 | 37 | 36 | 36 | 37 | 37 | 37 | 37 | 36 | 36 | 36 | 36 | 36 | 37 | 37 | 36 | 36 | 35 | 37 | 37 | 37 | 37 | 37 | 35 | 36 | 36 | 36 | 36 | .... | 36.40 |
| October | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31.00 |
| | 48 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 35 | 36 | 36 | 37 | 37 | 37 | 36.87 |
| November | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | .... | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | .... | 31.00 |
| | 48 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | .... | 37.00 |
| December | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31.00 |
| | 48 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 36 | 37 | 36 | 36 | 37 | 36.29 |
| 1901. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| January | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31.00 |
| | 48 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 36 | 38 | 38 | 37.03 |
| February | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | .... | .... | .... | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | .... | .... | .... | 31.00 |
| | 48 | 38 | 38 | 38 | 38 | 38 | 37 | 38 | 38 | 38 | 38 | 38 | 37 | 38 | 37 | 37 | 37 | 38 | 37 | 38 | 37 | 37 | 37 | 38 | 38 | 37 | 38 | 37 | 37 | .... | .... | .... | 37.57 |
| March | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31.00 |
| | 48 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 37 | 38 | 38 | 38 | 37 | 38 | 38 | 38 | 37 | 38 | 38 | 38 | 38 | 37 | 37 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 37.58 |
| April | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | .... | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | .... | 31.00 |
| | 48 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | .... | 38.00 |
| May | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31.00 |
| | 48 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38.00 |
| June | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | .... | 30.00 |
| | 36 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | .... | 31.00 |
| | 48 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 38 | 37 | 37 | 37 | 37 | 36 | 36 | 36 | 36 | 36 | .... | 37.53 |

## C C C 2.

## INCREASING THE WATER SUPPLY OF WASHINGTON, DISTRICT OF COLUMBIA.

This work is being prosecuted under an act making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June 30, 1899, and for other purposes, approved June 30, 1898.

The clause of this act making appropriations for this work is as follows:

> Washington Aqueduct Tunnel: The Secretary of War is hereby authorized and directed to resume work on the Washington Aqueduct Tunnel and its accessories and the Howard University Reservoir, authorized by section two of the act approved July fifteenth, eighteen hundred and eighty-two, entitled "An act to increase the water supply of the city of Washington, and for other purposes," and to prosecute and complete the same; the work on the said tunnel and accessories to be carried on in accordance with the plans of the board of experts as set forth in its report dated January seventeenth, eighteen hundred and ninety-six, House Document numbered one hundred and sixty-six, Fifty-fourth Congress, first session, which plans have been approved by the Chief of Engineers and the Secretary of War. And to carry out the provisions of said act and this paragraph, the balance remaining unexpended from the appropriations made by the said act of July fifteenth, eighteen hundred and eighty-two, and by subsequent acts for said purpose, amounting to two hundred and ninety-seven thousand two hundred and ten dollars and fifty cents, is hereby reappropriated, to be advanced out of the revenues of the United States, and not subject to the conditions of the capital account created by the act of July fifteenth, eighteen hundred and eighty-two, and the sum of two hundred and ninety-seven thousand two hundred and ten dollars and fifty cents is also hereby appropriated out of the surplus general revenues of the District of Columbia, to be applied to such parts of the work and in such order as to time as the Secretary of War may deem necessary to promote as soon as practicable the completion of the entire system of said works: *Provided*, That the sums herein set apart and appropriated shall be immediately available and shall be expended under the direction of the Secretary of War and the supervision of the Chief of Engineers; and the work shall be carried on by contract or otherwise, as the Secretary of War may deem best for the public interest.

The work is to be carried on, in compliance with the above act, "in accordance with the plans of the Board of experts as set forth in its report, dated January 17, 1896."

That portion of the report referred to which contains the plans of the Board of experts is as follows:

### PERCOLATION.

One of the objections against the tunnel that has been urged with much force is the liability of leakage or percolation outward from the tunnel into the ground when it is subjected to the pressure of the water. This is a point to which we have devoted much time and attention. It is evident that should the leakage be sufficiently great the dangers to be apprehended from this source might be considerable. These possible dangers, however, are materially lessened by a consideration of the fact that from all the information we have been able to collect, it appears that for a considerable portion of the tunnel the natural level of the water in the ground is not far different from that of the hydraulic grade line of the water in the tunnel.

Since this tunnel was abandoned the new Croton Aqueduct, supplying the city of New York with water, has been completed. A portion of this aqueduct, embracing a length of about 7 miles, is subjected to internal pressure with a maximum pressure due to a head of about 130 feet. In this case no serious percolation has been observed, although the surface of the ground is at several points much below the hydraulic grade line. An experiment made for the purpose of determining the amount of this leakage outward from the aqueduct showed that the total loss in the whole 7 miles from this cause did not exceed 225,000 gallons in twenty-four hours.

With this practical example before the commission, and guided by our own judgment and experience, we believe that if the spaces now existing between the brickwork and the rock are thoroughly filled with rubble masonry and grouted, that the tunnel can be made sufficiently water-tight, and that the leakage under a head of 150 feet will not be large enough to prove an obstacle in the way of the successful completion and operation of the tunnel. In this connection we recommend that the interior surface of the whole tunnel should receive a double coating or wash of pure Portland cement. This treatment will aid materially in making the brickwork more impervious to the passage of water.

Objection has also been urged against the tunnel on the ground of the danger of contamination to the supply from the percolation of ground water into the tunnel when it is empty. This condition can occur but seldom, perhaps but once or twice a year at the most, when the tunnel is pumped out for examination. The amount of this percolation is very slight, even under present conditions, with the lining practically open. While our examinations of the tunnel were under way, samples of water at various points were collected for analysis, and not without some difficulty on account of the small amount of water flowing. These analyses do not indicate that anything of a contaminating nature passes into the tunnel when it is empty.

If the tunnel is completed in accordance with our recommendations, the percolation will be so trifling as to be unimportant, especially when taken in connection with the general absence of organic matter in the wells of those portions of the city which are much more thickly populated than is the ground directly over the tunnel.

### SILTING.

It is known that at times the Potomac water contains a large amount of silt. An idea of the amount which may be expected to deposit in the tunnel may be formed from the results of sedimentation which has taken place in the past in the present aqueduct, where it has not been the source of serious trouble. If these deposits occur they should not be allowed to accumulate, but should be removed from time to time, and this can be readily done by means of the four shafts retained and which will be equipped with the necessary hoisting machinery to accomplish this object.

### COMPLETION OF THE MAIN TUNNEL.

A portion of the tunnel, about 6,000 feet in length, now contains no lining, and the remainder is provided with a lining of varying section, as shown on one of the accompanying plates. Our estimate for the completion of the tunnel proper is, therefore, naturally divided into two parts.

We have estimated for completing the unlined portions of the tunnel with brickwork of the same form as that used in the lined portions which are provided with an invert. There are large quantities of loose rock in the tunnel at these points, which can be used for the rubble-masonry backing.

Our examination of those portions of the tunnel already lined, taken in connection with the published testimony and supplemented by the statements of others whom we have called before us, shows that there is a great diversity in the character of the lining. In some portions of the tunnel vertical rubble side walls have been built. Where these occur we have been unable to find any void spaces of magnitude behind the walls. In other cases the side walls are built of brick, generally filled on the outside to the crown of the arch with loose packing. Some portions contain a brick invert. As a general rule, empty spaces exist over the crown of the arch. In the westerly part of the tunnel these spaces are comparatively small, but in the easterly portion they are much larger, in some cases extending to more than 10 feet in height. These cavities must be filled with rubble masonry, laid solidly in cement mortar. In some cases timbering exists in the spaces over the arch. The timbering should be taken out in sections and rubble masonry substituted. Where the spaces will not allow of laying rubble masonry, provision has been made for filling the spaces with stone packed by hand and then grouting the whole mass with cement under pressure. In other words, it is intended to fill every space or void now existing in these portions of the tunnel either with cement, grouted rubble, or with rubble masonry laid in cement, thus securing a solid backing everywhere between the lining and the rock.

Where no invert now exists, we recommend a slight excavation of the rock and the building of an invert of Portland cement concrete, smoothly finished.

### REENFORCEMENT OF THE ROCK CREEK SECTION.

Experiments made by Major Knight in 1895, and detailed in his report upon this subject, indicate that the covering of rock over the tunnel in the Rock Creek Valley is not sufficient to provide the necessary resistances required, or to prevent serious percolation. These experiments confirm our own opinion that for a length of about 1,000 feet under Rock Creek it will be necessary to provide some special form of construction. We have considered various plans, and have come to the conclusion that either a subtunnel, built at a considerable distance below the present tunnel, should be provided, or that the present tunnel should be lined with cast iron surrounded with concrete. A majority of the commission is inclined toward the metallic lining. The cost of the two plans is practically the same.

### ACCESSORIES.

In the course of our examination we have found that it will be necessary to provide several accessories in connection with the tunnel for the purpose of making it available and for the purpose of maintaining it in a proper manner after construction is completed. We will now allude to these briefly in their order, beginning at the westerly end.

A connection now exists with the 7-foot by-conduit around the distributing reservoir. A direct connection should also be made with the reservoir, near the westerly shaft, to be controlled by a gatehouse, provided with the necessary gates and appliances to regulate the flow.

As it is probable that there are voids existing between the brick lining and the rock surrounding the westerly shaft, the whole of this shaft should be thoroughly grouted.

The estimate has included a gatehouse covering the shaft, which will contain hoisting apparatus of simple construction for the raising of material from the bottom of the tunnel. The shaft is to be provided with a deep sump protected by heavy paving.

The profile of the tunnel shows a slight summit near the westerly end, and we have provided a small brick structure through this divide for the purpose of draining the water in an easterly direction.

We have deemed it advisable to close the Foundry Branch shaft entirely. This can only be accomplished by providing drainage through the Fayette street summit in an easterly direction to the Rock Creek shaft. We recommend the construction through this summit of a 24-inch masonry pipe properly protected with concrete. Owing to slight percolation in the immediate neighborhood of the Foundry Branch shaft, the brick lining at this point is to be reenforced, the shaft lined, grouted, and permanently sealed.

All three of the air shafts existing on the line of the tunnel are to be repaired, grouted, and protected by suitable coverings.

As the Rock Creek portion is the lowest level in the tunnel, and there is here but a small amount of material over the arch, this point has been selected for the construction of a 48-inch blow-off, with gates, to empty the tunnel of all the water which can be taken out, with the exception of that which must be pumped. The shaft is to be provided with a metal lining 6 feet in diameter, backed with brick and concrete. To this lining will be attached a cover of sufficient strength to resist the internal pressure. The shaft will be protected by a brick house provided with hoisting apparatus. A short distance from the shaft an excavation will be made in the rock to receive a large pump pit surrounded with a heavy wall and containing the pumping machinery, the whole covered by a substantial superstructure. A boiler house will contain the necessary boilers for supplying power to the pumps, which will be of sufficient capacity to raise 12,000,000 gallons in twenty-four hours from the level of the tunnel to Rock Creek.

In the Champlain avenue shaft the present timbering is to be repaired and the shaft lined with brick and concrete, containing an opening not less than 8 feet in diameter. A standpipe 25 feet in height should be built upon the top of the shaft, and the whole covered with a brick house containing the pumping and hoisting machinery. A connection with the local sewer should be made at this point to avoid the discharge of water onto the surface of the ground.

The Howard or easterly shaft is to be reenforced by a 12-inch brick lining inside the present shaft, and the backing of the shaft grouted throughout its whole height. There will be a paved sump at the bottom.

A liberal sum has been estimated for the erection of a gatehouse over the easterly shaft; it is an important adjunct in connection with the construction of the tunnel. The foundation of the gatehouse is to be independent of the shaft and sunk to a considerable depth, not less than 50 feet below high water in the reservoir. The gatehouse will be large enough to control the flow of water to different parts of the reservoir, and double sets of gates will be provided for this purpose. It will also receive the effluent water from the reservoir and discharge it into the large cast-iron main already laid from the reservoir and connecting with the distribution system.

### ESTIMATES.

The following table contains estimates for completing the different portions of the tunnel above alluded to. The estimates include what we deem to be a sufficient allowance for superintendence and contingencies. The total amounts to $897,837. In our judgment the tunnel can be completed in a first-class manner, with all accessories, and ready for operation, for the above sum:

| | |
|---|---|
| For completing the unlined portion of the tunnel | $181,010 |
| For completing the portions already lined | 278,012 |
| Reenforcement of tunnel at Rock Creek | 138,000 |
| Total to complete tunnel proper | 597,022 |
| Appurtenances, including shafts, connections, gatehouses, machinery, etc | 220,315 |
| Miscellaneous, including cleaning and coating tunnel and pumping during construction, etc | 80,500 |
| Total | 897,837 |

The quantities on which we have based the above estimates have been taken from Senate Report No. 2686, part 1, Fiftieth Congress, second session, and from subsequent computations made under our direction by Capt. C. McD. Townsend, Corps of Engineers, United States Army, whose services were kindly placed by you at our disposal; also upon the supposition that the whole work will be completed under proper inspection and superintendence within two years.

### ADDITIONAL CONSIDERATIONS.

We desire to emphasize the importance of providing proper detailed designs for the construction of the tunnel and all the appliances necessary for its operation and briefly described above.

In connection with the various pumping plants, which from the peculiar profile of the tunnel it is necessary to maintain at various points, we have the following recommendations to make: A selection of men should be made from the permanent force employed upon the maintenance of the completed system. These men should be drilled in the operation of all the machinery connected with the tunnel to fit them for working the pumps promptly whenever it becomes necessary and to insure the maintenance of all the machinery in good order.

Our instructions do not direct any consideration of the construction or sufficiency of the reservoir near the Howard University nor its outlets into the distribution system. We have, therefore, confined ourselves to a study of the tunnel proper and its appurtenances. Realizing, however, that the tunnel and the reservoir form part of one harmonious system, and realizing the magnitude of the interests depending upon the security of these works, we recommend that the most careful examination should be made both of the reservoir and of the connections with the distributing system before the tunnel is put into service.

The work recommended by the board of experts may, then, be classified as follows:

(1) Lining the unlined portion of the tunnel with brick masonry, including invert, and backing same with rubble masonry or concrete.

(2) Constructing an invert in portions of lined tunnel where none was originally built.

(3) Repairing the defective lining already built by removing the timber and loose stone backing and replacing it with rubble masonry or concrete, or grouting where necessary.

(4) Arranging the drainage of the tunnel west of Rock Creek shaft so that all drainage may be collected at the Rock Creek shaft sump.

(5) Lining the portion of the tunnel in the vicinity of Rock Creek shaft with iron, finished on the interior with brick masonry.

(6) Filling the voids in backing, where dry rubble was used, by grouting same.

(7) Constructing the necessary accessories, including gatehouses, blow-off at Rock Creek, air shafts, etc.

(8) In addition to the above, specially mentioned by the board of

experts, the preparation of the Howard University Reservoir for the reception of water and the laying of the mains necessary for furnishing the supply.

The work accomplished during the year was as follows:

1. *Lining unlined portions of the tunnel.*—In Foundry Branch west, 60 feet of brick invert, side walls, and arch were constructed, completing this heading. In Foundry Branch east, 55 feet of brick invert, 205 feet of brick side walls, and 1,785 feet of brick arch were constructed, completing this heading. In Rock Creek west, 710 feet of brick invert, 372 feet of brick side walls, and 617 feet of brick arch were constructed, completing this heading.

2. *Construction of invert in part of tunnel formerly lined.*—In the heading from the east shaft 860 feet of brick invert were constructed, completing this heading.

3. *Repairing the defective lining.*—The defective lining had been repaired during the previous fiscal year with the exception of 2,250 feet in the heading from the east shaft. This work is now entirely completed.

4. *Arranging drainage of tunnel west of Rock Creek.*—This work was completed during the previous fiscal year.

5. *Iron lining of tunnel at Rock Creek.*—This work was completed during the previous fiscal year.

6. *Filling voids in dry rubble backing.*—This work was completed during the previous fiscal year.

After completing a section of the tunnel it has been given a wash coat of Portland cement. During the year 13,901 feet of the tunnel has been thus treated, completing this work.

7. *Accessory works.*—These include the west and east gatehouses, air shafts, and pumps for emptying the tunnel.

The west gatehouse, situated at the distributing reservoir, is completed so far that it is now in condition to supply the tunnel through the by-conduit of the distributing reservoir. The east gatehouse is in an advanced stage toward completion and will probably be ready for service in three months.

The air shafts are completed except surface construction.

The power house at the east shaft for the Bacon Air Lift pumping plant is nearly completed. The working shaft at Foundry Branch has been closed and filled and concreted up to the surface of the rock. Rock Creek shaft has been lined with iron and is completed with the exception of the top section.

The blow-off at Rock Creek shaft, with the two 48-inch valves, is nearly completed. The pump pit and connections at the shaft are completed ready to receive the centrifugal pumps. The boiler for these pumps is in place.

At Champlain avenue shaft the power house for the pumping plant is under way, and the shaft for a distance of 66 feet has been filled with concrete and lined. At the east shaft a new brick lining 12 inches thick has been placed inside of old lining.

8. *Howard University Reservoir.*—The reservoir has been cleaned up, the circulating conduit completed, and a line of four 48-inch pipe laid, connecting the east gatehouse with the filter gatehouse. The revetment of the banks has been completed except in front of the gatehouses.

It is expected that the new reservoir will be placed in service during the coming fall.

### PRESENT CONDITION OF TUNNEL.

The tunnel is now completed from the west shaft to Howard University Reservoir.

### REPORT OF ASSISTANTS.

The reports of Lieut. G. M. Hoffman, Corps of Engineers, and Mr. R. C. Smead, assistant engineer, are appended, with tables showing the amount and cost of work accomplished.

### *Money statement.*

#### INCREASING THE WATER SUPPLY OF WASHINGTON, D. C.

| | |
|---|---|
| July 1, 1900, balance unexpended | [1]$480,406.45 |
| Amount appropriated by act March 1, 1901 | 162,222.97 |
| | 642,629.42 |
| June 30, 1901, amount expended during fiscal year | 357,603.53 |
| July 1, 1901, balance unexpended | 285,025.89 |
| July 1, 1901, outstanding liabilities | 58,139.11 |
| July 1, 1901, balance available | 226,886.78 |
| July 1, 1901, amount covered by uncompleted contracts | 108,964.12 |
| Amount available for completion of existing project | 117,922.66 |

*Abstract of contracts in force June 30, 1901.*

| Name. | Rate. | Date of approval. | Date of beginning work. | Date of expiration. |
|---|---|---|---|---|
| Frederick Brick Works, for bricks......per M.. | $11.40 | Mar. 7, 1899 | Mar. 24, 1899 | |
| Cranford Paving Co., for broken stone, per cubic yard. | 2.10 | Aug. 25, 1899 | Sept. 18, 1899 | |
| Cranford Paving Co., for riprap stone, per ton. | 1.75 | .....do....... | Oct. 5, 1899 | |
| James H. McGill, for Cumberland cement, per barrel. | .87 | May 3, 1900 | Apr. 22, 1900 | |
| Camden Iron Works, for pumping plant........ | 10,500.00 | June 4, 1900 | ................ | 6 months. |
| Bacon Air Lift Co., for pumping plants........ | 60,300.00 | June 13, 1900 | ................ | 8 months. |
| Lincoln-Richards Sand Co., for sand, per cubic yard. | 1.30 | July 6, 1900 | Aug. 7, 1900 | |
| U. S. Cast Iron Pipe and Foundry Co., for pipe, per ton. | 24.00 | Sept. 24, 1900 | ................ | 2 months. |
| Kennedy Valve Mfg. Co., for valves.....each.. | 795.00 | Oct. 9, 1900 | ................ | 6 months. |
| U. S. Cast Iron Pipe and Foundry Co., for pipe, per ton. | 22.95 | Oct. 12, 1900 | ................ | 2 months. |
| Coffin Valve Co., for sluice gates.........each.. | 521.00 | Oct. 22, 1900 | ................ | 6 months. |
| Atlas Portland Cement Co., for cement, per barrel. | 1.55 | Nov. 19, 1900 | Nov. 12, 1900 | |

## APPENDIX I.

### REPORT OF LIEUT. G. M. HOFFMAN, CORPS OF ENGINEERS.

OFFICE OF THE WASHINGTON AQUEDUCT,
*Washington, D. C., July 1, 1901.*

COLONEL: The following report for the fiscal year 1901, which I have the honor to submit, deals with the progress, cost, and features of that part of the work for increasing the water supply of Washington, D. C., of which I have had active charge under your direction:

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[1] Including 75 cents disallowed in vouchers for June, 1900, and deposited in Treasury July 23, 1900.

### NEW RESERVOIR.

Under this head, with subdivisions as given, are included the surface constructions—pipe lines excepted—necessary for completing the auxiliary works at the eastern end of the Washington Aqueduct Tunnel.

*Revetment of reservoir banks.*—At two places on the west bank, where slips had occurred, repair work was carried on. It consisted of the removal of rubble and broken stone, filling in with tamped gravel, and relaying the revetment to grade. The gravel filling amounted to 173 cubic yards. The paving replaced amounted to 680 square yards.

The unfinished portion of the reservoir bank in the vicinity of the gatehouse is being graded and filled, and the paving has been commenced. Two hundred and eighty-eight square yards of new revetment has been laid, and the broken-stone layer spread over an additional 266 square yards. The excavation in grading amounted to 1,550 cubic yards.

The only extra material used was 44.55 cubic yards of broken stone.

During the fiscal year the expenditures under this head were $1,415.37 for labor, $93.55 for materials, making a total of $1,508.92.

*Cleaning bottom of reservoir.*—The rank growth of vegetation and accumulation of muck in the reservoir necessitated excavating to a depth of from a few inches to about 2 feet over nearly the entire bottom to render the reservoir satisfactory as a storage basin. An area of 97,088 square yards was gone over, and 11,194 cubic yards of muck, earth, roots, and rubbish were carted out.

After cleaning, a small force of men and two harrows were kept at work to prevent new vegetation from springing up.

The work is practically completed, and in this respect the reservoir is about ready for filling.

The expenditures under this head amounted to $7,015.46 for labor and $69.27 for tools, making a total of $7,084.73.

*Congressional spring house.*—Under an approved project, the old brick spring house was carried above the water line by building a concrete cap on top of the old walls, with a manhole for access into the interior. A new 6-inch valve was placed on the end of the supply pipe to the Capitol, having an extension stem through the manhole, with handwheel and indicator on top for regulating the supply.

In the cap there were 22 cubic yards of concrete. The materials were 35 barrels of Portland cement, 20.1 cubic yards of broken stone, and 8 cubic yards of sand.

The old brickwork was pointed up and the whole spring house given two coats of Portland cement wash.

The expenditures were $136.16 for labor and $196.04 for materials, making a total of $332.20.

*Drainpipe chamber.*—At the reservoir end of the 12-inch drain, beneath the dam, a chamber was built for the 12-inch closing valve and its operating mechanism, which consists of an extension stem, a handwheel, and indicator. The valve was placed in position and the work completed.

The excavation for foundation amounted to 12 cubic yards, and the concrete placed to 45.7 cubic yards.

The materials used were 60 barrels of Portland cement, 16 cubic yards of sand, and 35.61 cubic yards of broken stone.

The expenditures were $217.99 for labor and $269.81 for materials, making a total of $487.80.

*Circulating conduit.*—This work was constructed to discharge the water from the tunnel into the north end of the reservoir. As the water will be taken from the reservoir at the south end, the full benefit as a sedimentation basin is thus obtained. The conduit is a concrete tube 9 feet 10 inches interior diameter, with the arch above the springing line 16 inches thick, and vertical haunches. It was built in 30-foot sections, with expansion joints.

Work was carried on day and night, so that each section would be a monolith. In a few sections, on account of the nature of the foundation, plank had to be laid on which to place the concrete, but ordinarily the conduit was built directly on the soil. The lower half of the interior and the exterior were plastered with cement mortar. At the end a chamber was built with arrangement for stop plank to close the conduit in case cleaning is necessary. At the low points of the reservoir bottom two underdrains were built of 30-inch pipe, with paved inlets and outlets. Earth was banked against the conduit to prevent undercutting, and the whole work finished.

Materials used were as follows: 5,677 barrels of Portland cement, 1,388 barrels of natural cement, 1,473$\frac{11}{27}$ cubic yards of sand, 3,366 cubic yards of broken stone, and 10.52 cubic yards of gravel.

The excavation for foundation amounted to 3,541 cubic yards and the concrete placed to 3,666.9 cubic yards.

The expenditures were $14,958.33 for labor, $20,122.84 for materials, and $275.23 for lighting, making a total of $35,356.40.

*Face wall.*—This construction along the division line between the Howard University and Government lands was necessary to make room for the east power house. It was built of concrete, 387.2 cubic yards of which were placed. A good face was obtained by the use of cement mortar next the lagging and a treatment with cement wash after the forms were removed.

The excavation for foundation amounted to 1,674 cubic yards. The materials used were 420 barrels of Portland cement, 164⅓ cubic yards of sand, 237⅓ cubic yards of broken stone, and 114.78 cubic yards of gravel.

The expenditures were $1,576.38 for labor and $1,535.56 for materials, making a total of $3,111.94.

*East power house.*—The substructure has been completed, the work including 959 cubic yards of excavation, the placing of 189 cubic yards of concrete for foundations of house, stack, compressor, and floor of boiler room, and building brick foundation for boilers. The walls of the house have been carried about halfway up, the brickwork amounting to 39 cubic yards.

A self-supporting steel stack has been erected.

The air compressor and boilers have been installed by the contractors for the air-lift pumping plant.

The materials delivered and used were 195 barrels of Portland cement, 90 barrels of natural cement, 130 cubic yards of sand, 99.37 cubic yards of broken stone, 82.94 cubic yards of gravel, and 64,556 bricks.

The expenditures were $1,197.83 for labor, $1,904.37 for materials, and $818 for stack, making a total of $3,920.20.

*East-shaft gatehouse.*—Work on the massive substructure of this gatehouse over the east shaft of the tunnel has extended throughout the fiscal year. So great was the extent and depth of the foundations that the outside walls were first constructed in narrow trenches and utilized as retaining walls while the interior was being excavated. The concrete and cut-stone interior walls are progressing rapidly and it is expected will advance so far as to complete the substructure inside of a month. All the gates, valves, and other ironwork have been delivered. The pipes connecting with the 75-inch distributing main and the 48-inch drain pipe from the reservoir have been placed, and the chamber connecting with the circulating conduit has been built.

Preparations have been made for proceeding with the superstructure as soon as the substructure is finished. Plans for the building have been completed, specifications for materials and work have been drawn up, and bids for same have been accepted.

The work done includes 9,997.5 cubic yards excavation, 3,733 cubic yards concrete, and 917 cubic yards cut stone placed.

The materials delivered and used were 6,106 barrels of Portland cement, 1,202.97 cubic yards of cut stone, 3,616.44 cubic yards of broken stone, 459.31 cubic yards of gravel, 2,102⅓ cubic yards of sand.

The expenditures were $18,553.66 for labor, $700 for architect, and $78,059.36 for materials, making a total of $97,312.99.

*Filling around gatehouse.*—This work includes the puddle core along the gatehouse connecting with the puddle core of the dam, the embankment backing the puddle core and forming the bank of the reservoir, and the filling around the land side of the gatehouse.

The excavation for foundation of the puddle core amounted to 1,722 cubic yards; excavation of muck for embankment, 2,074 cubic yards; and the puddle material tamped in place to 2,804 cubic yards.

The selected material tamped in place on the embankment and around the gatehouse amounted to 11,207 cubic yards.

The expenditures for labor amounted to $4,905.26, and for materials $3.13, making a total of $4,908.39.

*Seventy-five inch main.*—The design of the joints of the old 75-inch pipe was defective in that by expansion of the pipe the lead calking was compressed and subsequent contraction left openings through which leakage occurred. To overcome the difficulty interior iron sleeves were placed covering the joints, the spaces between the sleeves and pipe being run full of lead, calked by hand in the usual manner. Forty-three of the 51 joints have been so treated, and the results are excellent, expansion joints being thus formed which are water tight under all conditions.

A 48-inch valve has been received for attachment to the large Y in the valve chamber at College and Fourth streets.

The expenditures have been $423.25 for labor, $1,983.20 for material, making a total of $2,406.45.

### CHAMPLAIN AVENUE POWER HOUSE.

The site was cleared by removing the piles of muck from the tunnel. Excavation for the foundation of the power house was made and the foundations for the boiler room, stack, and part of the engine room were put in. Work has necessarily been suspended pending the completion of the shaft lining.

A self-supporting stack has been erected.

The boiler plant has been installed by the contractors for the air-lift pumping plant.

The plans for the superstructure have been completed.

The work includes moving about 1,000 cubic yards of muck, excavating 344 cubic yards for foundations, placing 166 cubic yards of concrete, and building brick foundations for boilers.

Materials used were 255 barrels of Portland cement, 73¾ cubic yards of sand, 133.46 cubic yards of broken stone, and 2,504 bricks.

The expenditures were $1,201.54 for labor, $1,107.06 for materials, and $781 for stack, making a total of $3,089.60.

### MISCELLANEOUS.

As the machinery, plant, and tools purchased were generally used on all parts of the work they are included under one head, without distribution. The expenditures under this head amounted to $2,391.67.

The proportional part of the office pay roll and office expenses charged to the above works amounted to $4,817.90.

The cost for keeping a watchman at the new reservoir was $720.

A table is submitted herewith giving, under the different heads, a résumé of the work and cost of the same to date.

Very respectfully, your obedient servant,

G. M. Hoffman,
*First Lieutenant, Corps of Engineers.*

Lieut. Col. A. M. Miller,
*Corps of Engineers, U. S. A.*

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## Appendix II.

### REPORT OF MR. R. C. SMEAD, ASSISTANT ENGINEER.

Office of the Washington Aqueduct,
*Washington, D. C., June 30, 1901.*

Colonel: I have the honor to submit the following report of work done on the tunnel and pipe lines across the new reservoir for the fiscal year ending June 30, 1901.

### TUNNEL.

*At the west-shaft gatehouse.*—The masonry work of the substructure and the connection with the conduits were completed.

Five hundred and forty and six-tenths cubic yards of cut stone masonry, 25 cubic yards of rubble masonry were laid. Six hundred and forty cubic yards of concrete were used for backing of masonry.

Four hundred and forty-nine cubic yards of excavation were made for foundations of superstructure and connections with 48-inch and 30-inch mains.

The 15 gates controlling the water were set.

The construction of the superstructure was commenced in March and has been nearly completed. Two hundred and thirty-four thousand three hundred and fifty brick were used in the walls. The corrugated-iron roof of main building and towers was constructed and put on by the Penn Bridge Company.

### AT FOUNDRY BRANCH SHAFT.

*In the west heading.*—Sixty feet of brick invert, side walls, and arch were constructed. This completed this heading.

*In the east heading.*—Fifty-five feet of brick invert, 205 feet of brick side walls, and

1,785 feet of brick arch were constructed. Eight hundred and eighty-six cubic yards of rubble masonry were used as backing for brick lining.

Two thousand eight hundred and seventy-five feet of the lining were covered with two coats of Portland cement wash.

One hundred and sixty-eight cubic yards of muck, the railroad track, and gas mains were removed. This heading is entirely completed.

At the shaft the east and west headings were connected by a 5-ring brick arch in which 37,000 brick were used. Above this brick arch the shaft was filled for 23 feet with concrete. One hundred and eighty-nine cubic yards of concrete were used.

The closing of this shaft is completed with the exception of the earth filling over concrete to top of shaft.

### AT ROCK CREEK SHAFT.

*In the west heading.*—Seven hundred and ten feet of brick invert, 372 feet of brick side walls, and 617 feet of brick arch were constructed.

Six hundred and ninety-five cubic yards of rubble masonry were used for backing of brickwork.

Nine hundred and ninety feet of the old stone side walls were plastered.

Two thousand four hundred and thirty-two feet of the lining were given two coats of Portland cement wash.

Five rings of iron lining connecting the tunnel with shaft were put in. This heading is entirely completed.

Thirty-seven cubic yards of muck and all the railroad track and gas mains have been removed from the east and west headings.

The work of placing the iron lining in the shaft was commenced and all but the top section put in place.

The 20-inch pump suction connecting tunnel with sump and pump pit was put in place, also 4 sections of the 48-inch blow-off, and two 48-inch valves.

Four hundred and fifty-three cubic yards of concrete were used for backing of iron lining of shaft.

The work of constructing pump pit 25 feet in diameter for centrifugal pumps was commenced and nearly completed.

The excavation amounted to 1,552 cubic yards; brickwork, 76,000 brick; concrete, 391 cubic yards; rubble masonry, 16 cubic yards.

The foundation for superstructure over pump pit and shaft was constructed of concrete, 613 cubic yards of concrete being used.

Five thousand one hundred and fifty-two cubic yards of stone were taken out of the refuse pile, crushed for concrete, and used on different portions of the work.

The road leading from Lyons Mill Bridge to the shaft was kept in repair.

### AT CHAMPLAIN AVENUE SHAFT.

*In the west heading.*—One thousand nine hundred and eighty-nine feet of the lining were given two coats of Portland cement wash. This heading is entirely completed.

*In the east heading.*—Three thousand two hundred and ninety-eight feet of the lining were given two coats of Portland cement wash. This heading is entirely completed.

Ninety cubic yards of muck and all the railroad track and gas mains have been removed from the east and west headings.

The work of lining the shaft was commenced in May, and the connections with tunnel lining and 66 feet of the shaft lining have been completed. Forty-one thousand one hundred and fifty brick and 278 cubic yards of concrete were used.

### AT THE EAST SHAFT.

In the heading from this shaft 860 feet of brick invert were placed in the old work, 77 cubic yards of concrete being used for foundation of invert.

Five hundred and four feet of the old stone side walls were plastered.

Two thousand two hundred and fifty feet of the old arch were thoroughly grouted.

Three thousand three hundred and seven feet of the lining were given two coats of Portland cement wash.

Five hundred cubic yards of muck, the railroad track, and gas mains were removed from this heading. This heading is entirely completed.

A new lining of brick 12 inches thick was built inside of the old lining of shaft, 80,500 brick being used.

### PIPE LINES ACROSS RESERVOIR.

Four 48-inch pipe lines were laid from the east shaft gatehouse to the filtration gatehouse; the distance between these gatehouses is 1,462 feet. These pipe lines have been completed with the exception of filling in over pipe.

The excavation amounted to 4,276 cubic yards; back filling, 1,131 cubic yards; concrete for culvert, 20 cubic yards.

Very respectfully, your obedient servant,

R. C. Smead,
*Assistant Engineer.*

Lieut. Col. A. M. Miller,
*Corps of Engineers, U. S. A.*

*Distribution of expenses Washington Aqueduct tunnel and new reservoir.*

| Items. | Year ending June 30, 1899. | | Year ending June 30, 1900. | | Year ending June 30, 1901. | | Total. |
|---|---|---|---|---|---|---|---|
| | Labor. | Materials. | Labor. | Materials. | Labor. | Materials. | Labor and materials. |
| Report of Lieut. G. M. Hoffman: | | | | | | | |
| Revetment of reservoir banks | | | $11,665.55 | $8,661.51 | $1,415.37 | $93.55 | $21,835.98 |
| Cleaning bottom of reservoir | | | 894.27 | | 7,015.46 | 69.27 | 7,979.00 |
| Congressional spring house | | | | | 136.16 | 196.04 | 332.20 |
| Drainpipe chamber | | | | | 217.99 | 269.81 | 487.80 |
| Circulating conduit | | | 257.30 | 16.55 | 14,958.33 | 20,398.07 | 35,630.25 |
| Face wall | | | | | 1,576.38 | 1,535.56 | 3,111.94 |
| East power house | | | | | 1,197.83 | 2,722.37 | 3,920.20 |
| East shaft gatehouse | | | 1,177.79 | 2,376.22 | 18,553.66 | 78,759.36 | 100,867.03 |
| 75-inch main | | | 273.87 | 46.94 | 423.25 | 1,983.20 | 2,727.26 |
| Filling around gatehouse | | | 133.93 | | 4,905.26 | 3.13 | 5,042.32 |
| Air shafts (3) | | | 1,590.48 | 869.17 | | | 2,459.65 |
| Pumping plants | | | | 185.69 | | | 185.69 |
| Champlain avenue power house | | | | | 1,201.54 | 1,888.06 | 3,089.60 |
| Miscellaneous, watchmen, etc. | | | 1,058.00 | | 720.00 | | 1,778.00 |
| Machinery and plant | | | | | | 2,391.67 | 2,391.67 |
| Engineering and office expenses | | | 2,486.72 | | 4,817.90 | | 7,304.62 |
| Report of Mr. R. C. Smead: | | | | | | | |
| Intake system from filtration plant, filter gatehouse | | | | | 1,556.10 | 1,618.16 | 3,174.26 |
| Tools, machinery, and repairs | $603.00 | $7,006.71 | | 3,306.04 | 721.52 | 2,452.00 | 14,089.27 |
| Erecting and maintaining buildings | 1,334.00 | 1,596.61 | 31.00 | 67.99 | | | 3,029.60 |
| Repairing road to Rock Creek | 427.00 | 396.50 | 665.00 | 219.94 | 300.18 | | 2,008.62 |
| Retimbering shafts, building head houses | 3,865.00 | 3,308.76 | 114.00 | 17.60 | | | 7,305.36 |
| Building and repairing cars | 340.00 | 1,703.28 | 360.00 | 213.90 | | | 2,617.18 |
| Experimental arch at Rock Creek | 117.00 | 233.50 | | | | | 350.50 |
| Erecting gas plant and lighting tunnel | 644.00 | 6,602.78 | 586.00 | 4,008.32 | 230.00 | 899.73 | 12,970.83 |
| First pumping out of tunnel | 1,388.00 | 545.90 | | | | | 1,933.90 |
| Pumping out tunnel during construction | 6,470.00 | 1,903.58 | 6,328.00 | 315.15 | 4,900.00 | 369.06 | 20,285.79 |
| Trimming tunnel for lining | 13,508.00 | 1,076.89 | | | | | 14,584.89 |
| Excavating and track laying | 21,570.00 | 5,077.51 | 7,721.00 | 374.01 | | | 34,742.52 |
| Cutting drainage channels from Foundry Branch to Rock Creek— | | | | | | | |
| Trimming | 13,094.00 | 627.70 | 7,076.00 | 370.91 | | | 34,132.72 |
| Excavating | 12,674.00 | 290.11 | | | | | |

*Distribution of expenses Washington Aqueduct tunnel and new reservoir*—Continued.

| Items. | Year ending June 30, 1899. | | Year ending June 30, 1900. | | Year ending June 30, 1901. | | Total. |
|---|---|---|---|---|---|---|---|
| | Labor. | Materials. | Labor. | Materials. | Labor. | Materials. | Labor and materials. |
| Report of Mr. R. C. Smead—Continued. | | | | | | | |
| Cleaning out toothing in old brickwork | $326.00 | $290.11 | | | | | $616.11 |
| Cleaning snow and ice from roads | 138.00 | 38.50 | | | | | 176.50 |
| Hauling coal during blizzard | 63.00 | | | | | | 63.00 |
| Taking out rail left by contractors | 24.00 | 162.61 | | | | | 186.61 |
| Making centers for brickwork | 143.00 | 669.26 | | | | | 812.26 |
| Building brick lining and rubble backing | 12,097.00 | 9,657.88 | $27,779.00 | $36,034.25 | $18,722.12 | $20,983.91 | 125,274.16 |
| Concrete under invert | 2,823.00 | 1,984.29 | 13,700.00 | 8,390.96 | 854.24 | 361.33 | 28,113.82 |
| Repairing old arch with rubble backing and closing holes in arch | 4,832.00 | 2,820.80 | 38,614.89 | 14,895.15 | 1,089.50 | 285.29 | 62,637.63 |
| Placing iron lining under Rock Creek | 1,522.00 | 4,312.18 | 7,497.00 | 17,639.28 | | | 31,978.46 |
| Iron on hand not laid | | 1,008.00 | | | | | |
| Grouting in tunnel | | | 24,375.00 | 24,843.60 | 5,825.04 | 3,943.20 | 58,986.84 |
| Grouting in west shaft | | | 404.00 | 948.96 | | | 1,352.96 |
| Grouting and retimbering east shaft | | | 1,975.00 | 1,244.28 | 2,609.14 | 2,039.20 | 7,867.62 |
| Underpinning old sidewalls | | | 551.00 | 294.35 | | | 845.35 |
| Excavating sand at Rock Creek | | | 364.00 | | | | 364.00 |
| Invert and sump at west shaft | | | 816.00 | 197.25 | | | 1,013.25 |
| Crushing stone for invert | | | 1,929.85 | 189.46 | | | 2,119.31 |
| Plastering old stone side walls | | | 1,961.00 | 453.92 | 1,176.05 | 300.00 | 3,890.97 |
| Cement washing west shaft | | | 40.00 | 5.40 | | | 45.40 |
| Cement washing tunnel | | | 1,244.00 | 455.35 | 3,236.24 | 387.52 | 5,223.11 |
| Engineering and office expenses | 7,922.43 | | 11,579.28 | | 8,651.91 | 1,235.36 | 29,388.98 |
| Grading grounds at Rock Creek | | | | | 994.38 | | 994.38 |
| Excavating and cleaning tunnel | | | | | 5,076.00 | 196.73 | 5,272.73 |
| Closing Foundry Branch shaft | | | | | 1,040.63 | 875.92 | 1,916.55 |
| Closing Rock Creek shaft | | | | | 3,785.85 | 8,586.32 | 12,372.17 |
| Constructing Rock Creek pump pit | | | | | 5,458.39 | 3,277.49 | 8,735.88 |
| Constructing Rock Creek power house | | | | | 3,333.75 | 1,398.24 | 4,731.99 |
| Closing Champlain avenue shaft | | | | | 2,285.67 | 4,668.96 | 6,954.63 |
| Constructing west shaft gatehouse | | | 3,887.25 | 22,498.94 | 10,405.15 | 20,157.50 | 56,948.84 |
| Light pipe line | | | | | | 4,362.07 | 4,362.07 |
| Heavy pipe line across reservoir | | | | | 7,200.32 | 48,007.44 | 55,207.76 |
| | | | | | | | 868,821.91 |
| Total expenditures as per vouchers | 136,290.60 | | 316,788.67 | | 357,603.53 | | 868,821.91 |
| Outstanding liabilities July 1, 1901 | | | | | 58,139.11 | | |
| Appropriation "filtration plant:" | | | | | | | |
| Heavy pipe line across reservoir | | | | | 813.78 | 12,582.12 | 13,395.90 |
| Filtration plant | | | | | 8,366.13 | a653,452.55 | 661,818.68 |
| | | | | | 9,179.91 | 666,034.67 | 675,214.58 |

a Including land purchased.

*Table showing amount of work performed.*

| Class of work. | Year ending June 30, 1899. | Year ending June 30, 1900. | Year ending June 30, 1901. | Total. |
|---|---|---|---|---|
| REPORT OF LIEUT. G. M. HOFFMAN. | | | | |
| Revetment of reservoir banks: | | | | |
| Completed paving.........square yards.. | | 12,406.38 | 288 | 12,694.38 |
| Additional broken-stone layer.....do.... | | 22.52 | 266 | 288.52 |
| Old paving torn up.................do.... | | 6,084.1 | | 6,084.1 |
| Excavation for grading.....cubic yards.. | | 16,651.5 | 1,550 | 18,201.5 |
| Cleaning bottom: Excavation..........do.... | | 2,929 | 11,194 | 14,123 |
| Congressional spring house: Concrete..do.... | | | 22 | 22 |
| Drain-pipe chamber: | | | | |
| Excavation.........................do.... | | | 12 | 12 |
| Concrete...........................do.... | | | 45.7 | 45.7 |
| Circulating conduit: | | | | |
| Excavation.........................do.... | | | 3,541 | 3,541 |
| Portland concrete..................do.... | | | 2,750.9 | 2,750.9 |
| Natural concrete...................do.... | | | 916 | 916 |
| Plastering.................square yards.. | | | 8,752 | 8,752 |
| Back filling................cubic yards.. | | | 1,259 | 1,259 |
| Face wall: | | | | |
| Excavation.........................do.... | | | 1,674 | 1,674 |
| Portland concrete..................do.... | | | 387.2 | 387.2 |
| East power house: | | | | |
| Excavation.........................do.... | | | 959 | 959 |
| Portland concrete..................do.... | | | 189 | 189 |
| Brickwork..........................do.... | | | 39 | 39 |
| East shaft gatehouse: | | | | |
| Excavation.........................do.... | | 3,512.5 | 9,997.5 | 13,510 |
| Portland concrete..................do.... | | | 3,733 | 3,733 |
| Cut stone..........................do.... | | | 917.9 | 917.9 |
| 75-inch main: Excavation.............do.... | | 699 | | 699 |
| Filling around gatehouse: | | | | |
| Excavation for puddle core........do.... | | | 1,722 | 1,722 |
| Excavation for embankment......do.... | | 193 | 2,074 | 2,267 |
| Puddle placed......................do.... | | | 2,804 | 2,804 |
| Embankment material placed.....do.... | | | 11,207 | 11,207 |
| Air shafts: | | | | |
| Fayette street......................feet.. | | 156 | | 156 |
| Widow's Mite.......................do.... | | 152.33 | | 152.33 |
| Thirteenth street...................do.... | | 128.25 | | 128.25 |
| Champlain Avenue power house: | | | | |
| Clearing muck from site....cubic yards.. | | | 1,000 | 1,000 |
| Excavation.........................do.... | | | 344 | 344 |
| Portland concrete..................do.... | | | 166 | 166 |
| Brickwork..........................do.... | | | 5 | 5 |
| REPORT OF MR. R. C. SMEAD. | | | | |
| Tunnel: | | | | |
| Trimming....................linear feet.. | 5,919 | | 176 | 6,095 |
| Track laid..........................do.... | 20,594 | | | 20,594 |
| Material removed...........cubic yards.. | 29,678 | 8,578 | 800 | 39,056 |
| Timber removed from back of arch cords.............................. | 54 | 173 | | 238 |
| Brick laid......................number.. | 784,712 | 1,810,167 | 1,302,355 | 3,897,234 |
| New invert lined..................feet.. | 1,465 | 3,557 | 825 | 5,847 |
| New arch lined....................do.... | 784 | 2,532 | 2,435 | 5,748 |
| New side wall lined...............do.... | 1,435 | 3,167 | 727 | 5,329 |
| Relining Howard shaft............do.... | | | 128 | 128 |
| Brick laid in Howard shaft.....number.. | | | 80,500 | 80,500 |
| New invert placed in old lining....feet.. | 442 | 5,841 | 860 | 7,143 |
| Old lining repaired with rubble masonry, feet.............................. | 446 | 14,091 | | 14,537 |
| Concrete in place...........cubic yards.. | 943 | 3,926 | 80 | 4,949 |
| Masonry backing for old arch......do.... | 1,573 | 9,174 | | 10,747 |
| Masonry backing for new arch.....do.... | 1,236 | 2,814 | 11,581 | 15,631 |
| Iron lining for tunnel at Rock Creek, feet.............................. | 100 | 400 | 24 | 524 |
| Stone side walls plastered....linear feet.. | | 3,840 | 1,494 | 5,334 |
| Stone crushed...............cubic yards.. | 900 | 4,634 | 5,142 | 10,676 |
| Drainage changed from Foundry Branch to Rock Creek..............linear feet.. | 2,812 | 615 | | 3,427 |
| Old arch grouted....................do.... | | 11,911 | 2,250 | 14,161 |
| Old arch grouted, cement used..barrels.. | | 24,248 | 3,835 | 28,083 |
| Grouting west shaft, cement used..do.... | | 708 | | 708 |
| Grouting east shaft, cement used...do.... | | 1,144 | | 1,144 |
| Cement washing tunnel (two coats), linear feet.............................. | | 6,255 | 13,901 | 20,156 |
| Sand taken out of Rock Creek, cubic yards.............................. | | 577 | | 577 |
| Concrete placed at west shaft gatehouse, cubic yards.............................. | | 669 | 640 | 1,109 |
| Rubble masonry placed at west shaft gatehouse.................cubic yards.. | | | 25 | 25 |

*Table showing amount of work performed*—Continued.

| Class of work. | Year ending June 30, 1899. | Year ending June 30, 1900. | Year ending June 30, 1901. | Total. |
|---|---|---|---|---|
| REPORT OF MR. R. C. SMEAD—continued. | | | | |
| Tunnel—Continued. | | | | |
| Cut stone laid at west shaft gatehouse, cubic yards | | | 540.6 | 540.6 |
| Brick laid at west shaft gatehouse, number | | 1,900 | 234,350 | 236,250 |
| Excavation at west shaft gatehouse, cubic yards | | 4,132 | 449 | 4,581 |
| Concrete placed in closing Foundry Branch shaft ... cubic yards | | | 189 | 189 |
| Brick laid in closing Foundry Branch shaft ... number | | | 37,050 | 37,050 |
| Concrete placed closing Rock Creek shaft, cubic yards | | | 453 | 453 |
| Iron lining placed closing Rock Creek shaft ... feet | | | 42 | 42 |
| Excavation for pump pit at Rock Creek shaft ... cubic yards | | | 1,552 | 1,552 |
| Rubble masonry placed in pump pit at Rock Creek shaft ... cubic yards | | | 16 | 16 |
| Concrete placed in pump pit at Rock Creek shaft ... cubic yards | | | 391 | 391 |
| Brick laid in pump pit at Rock Creek shaft ... number | | | 76,350 | 76,350 |
| Concrete placed in power-house foundation at Rock Creek shaft ... cubic yards | | | 613 | 613 |
| Concrete placed in closing Champlain Avenue shaft ... cubic yards | | | 278 | 278 |
| Brick laid in closing Champlain Avenue shaft ... number | | | 41,650 | 41,650 |
| New reservoir: | | | | |
| 48-inch pipe laid across reservoir, number | | | 502 | 502 |
| Excavation for pipe lines across reservoir, cubic yards | | | 4,276 | 4,276 |
| Filling excavation for pipe lines across reservoir ... cubic yards | | | 1,131 | 1,131 |

*Table showing amount of work performed during the fiscal year ending June 30, 1901.*

| | Trimming. | Material removed. | Brick used. | New brick lining. | | | Relining Howard shaft. | | Invert placed in old lining. | Concrete under invert. | Rubble masonry backing of new arch. | Iron lining of tunnel at Rock Creek. | Old stone side walls plastered. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Invert. | Side walls. | Arch. | Distance. | Brick used. | | | | | |
| 1900. | *Feet.* | *Cubic yds.* | | *Feet.* | *Feet.* | *Feet.* | *Feet.* | | *Feet.* | *Cu. yds.* | *Cubic yards.* | *Feet.* | *Feet.* |
| July | | 460 | 245,425 | 675 | 577 | 104 | | | | 60 | 196 | | 650 |
| August | | 77 | 218,600 | 90 | 90 | 275 | 5 | | 860 | 17 | 397 | | 340 |
| September | | 18 | 141,330 | | | 166 | 123 | 80,500 | | | 97 | | |
| October | | 33 | 187,200 | | | 547 | | | | | 202 | | 504 |
| November | | | 149,200 | | | 420 | | | | | 193 | | |
| December | | 4 | 65,600 | | | 145 | | | | | 66 | 4 | |
| 1901. | | | | | | | | | | | | | |
| January | 90 | 60 | 115 100 | | | 445 | | | | 3 | 262 | 12 | |
| February | 50 | 54 | 120,400 | 60 | 60 | 333 | | | | | 168 | | |
| March | 10 | 94 | 59,500 | | | | | | | | | 8 | |
| April | 26 | | | | | | | | | | | | |
| May | | | | | | | | | | | | | |
| June | | | | | | | | | | | | | |
| Total | 176 | 800 | 1,302,355 | 825 | 727 | 2,435 | 128 | 80,500 | 860 | 80 | 1,581 | 24 | 1,494 |

*Table showing amount of work performed, etc.*—Continued.

| | Old work grouted. | | Tunnel cement washed, 2 coats. | West shaft gatehouse. | | | | | Closing F. B. shaft. | | Closing R. C. shaft. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Distance. | Cement. | | Cut stone. | Concrete. | Rubble masonry. | Excavation. | Brick used. | Brick. | Concrete. | Iron lining. | Concrete. |
| **1900.** | *Feet.* | *Barrels.* | *Feet.* | *Cubic yards.* | *Cubic yds.* | *Cubic yds.* | *Cubic yds.* | | | *Cu. yds.* | *Feet.* | *Cubic yds.* |
| July | | | 3,444 | 278.9 | 324 | | | | | | | |
| August | | | 3,298 | 261.7 | 151 | | | | | | | |
| September | | | | | 18 | 4 | | | | | | |
| October | 830 | 1,346 | | | 108 | 21 | | | | | | |
| November | 1,270 | 2,066 | | | 39 | | | | | | | |
| December | 150 | 350 | | | | | | | | | | |
| **1901.** | | | | | | | | | | | | |
| January | | 73 | 2,250 | | | | 288 | | | | | |
| February | | | 2,034 | | | | 161 | | | | | |
| March | | | 2,875 | | | | | 49,500 | | | 7 | 57 |
| April | | | | | | | | 86,000 | 37,050 | 95 | 7 | 26 |
| May | | | | | | | | 67,000 | | 94 | 21 | 237 |
| June | | | | | | | | 31,850 | | | 7 | 139 |
| Total | 2,250 | 3,835 | 13,901 | 540.6 | 640 | 25 | 449 | 234,350 | 37,050 | 189 | 42 | 459 |

| | Pump pit, Rock Creek. | | | | Power house, Rock Creek, concrete. | Closing C. A. shaft. | | Stone crushed. | Pipe line across reservoir. | | Number of pipes. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Excavation. | Rubble masonry. | Concrete. | Brick. | | Brick. | Concrete. | | Excavation. | Fill. | |
| **1900.** | *Cubic yards.* | *Cubic yards.* | *Cubic yards.* | | *Cubic yards.* | | *Cubic yards.* | *Cubic yards.* | *Cubic yards.* | *Cubic yds.* | |
| July | | | | | | | | 1,191 | | | |
| August | 273 | | | | | | | 1,475 | | | |
| September | 258 | | | | | | | 616 | | | |
| October | 554 | 16 | 35 | | | | | 371 | | | |
| November | 377 | | 72 | | | | | 422 | | | |
| December | | | 284 | 76,350 | 130 | | | 467 | | | |
| **1901.** | | | | | | | | | | | |
| January | | | | | 424 | | | 600 | 944 | | |
| February | | | | | | | | | 1,546 | | 25 |
| March | | | | | | | | | 1,786 | | 39 |
| April | | | | | | | 15 | | | 181 | 188 |
| May | | | | | | 30,600 | 143 | | | | 219 |
| June | | | | | 59 | 10,550 | 120 | | | 950 | 31 |
| Total | 1,552 | 16 | 391 | 76,350 | 613 | 41,650 | 278 | 5,142 | 4,276 | 1,131 | 502 |

## C C C 3.

## WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT.

By acts approved June 30, 1898, and March 3, 1899, the sum of $8,000 was appropriated for "investigating the feasibility and propriety of filtering the water supply of Washington." This investigation was conducted and a report thereon submitted to Congress on March 28, 1900.

In this report it was recommended that for the filtration of the Potomac water, as delivered for the Washington water supply, the

American or rapid sand filtration be adopted. This method involves the application of a coagulant, sulphate of alumina, to the raw water.

By act approved June 6, 1900, an appropriation of $200,000 was made "for establishing those portions of a filtration plant which are essential to the operation of either system of filtration adopted, including necessary land, grading, masonry, and appurtenances."

A project for the expenditure of this appropriation was submitted and was approved August 15, 1900. The project consisted of the purchase of land sufficient for the erection of the plant and a clear-water basin, in case the American system were adopted, the estimate for land alone for the slow sand system being more than $550,000.

During the second session of the Fifty-sixth Congress the subject of filtration was before the Senate Committee on the District of Columbia, and an examination of experts on the subject of filtration was held in New York City. The subject was also taken up by the subcommittee on the District of Columbia of the House Committee on Appropriations. At the examination of experts by the Senate committee and the hearing before the House subcommittee, a strong opposition to the use of any chemical as a coagulant in any process of filtration of the Washington water supply was manifested by the resolutions of the Washington Board of Trade, the Washington Business Men's Association, and the Medical Society of the District of Columbia. This manifest opposition by the future consumers of proposed filtered water had the desired effect, and Congress, complying with the expressed desire of the citizens of the District, as manifested by the above organizations, by act approved March 1, 1901, appropriated $500,000 "toward establishing a slow sand filtration plant, and for each and every purpose connected therewith, including the preparation of plans, and for the purchase of such scientific books and periodicals as may be approved by the Secretary of War, to be available immediately and until expended."

The evident and manifest intention of Congress has thus been declared to be in favor of the establishing of a slow sand filtration plant for the Washington water supply, in contradistinction to any system of filtration which may require the use of any chemical as a coagulant.

The site for the filtration plant as recommended by the report from this office was on ground situated on either side of First street NW., in the immediate vicinity of the new reservoir, and adjacent to the grounds of the Soldiers' Home. Some controversy or difference of opinion as to the location of a site for the plant arose, but it was finally decided to locate the plant as at first recommended, and to purchase enough land to provide for the filtration of the total daily capacity of the Washington Aqueduct, or 75,000,000 gallons per diem.

## OPERATIONS DURING THE YEAR.

On September 29, 1900, from the appropriation of $200,000, act of June 6, 1900, the block bounded by First street, Detroit street, Emporia street, and the lands of the United States, containing 169,772 square feet, was purchased from Stellwagen and Edmonston, trustees, at a cost of 45 cents per square foot, or a total of $76,397.40. It was proposed to expend the remainder of the appropriation, or as much as was necessary, in the construction of a gatehouse and clear-water basin, with the necessary gates, valves, and connections, and an intake for pumping the water to the filter beds.

When, by act of March 1, 1901, Congress decided that the slow sand system should be adopted by appropriating $500,000 more toward filtration, all plans were adapted to this system, and an additional purchase of land was made, being enough to serve for a slow sand filtration plant with a capacity of 75,000,000 gallons per diem.

The land purchased consisted of lots 2 to 13, inclusive, in block 26 and all of blocks 29 and 30 in Stellwagen and Edmonston's addition to Le Droit Park, and squares 13, 14, 15, 16, and 39 in Dobbins's addition to the city of Washington, D. C., being in all 1,207,847 square feet, at 45 cents, thus requiring $543,531.15. This left available, less outstanding liabilities, a sum of about $30,000, which it was deemed would be required to complete the gatehouse and its connections and the intake for the pumps. It was deemed wisest to expend this balance for this purpose, in order that the new reservoir should be utilized in connection with the tunnel for increasing the water supply of Washington as soon as finished, without waiting for the completion of the filtration plant.

The work accomplished during the fiscal year consisted in making drawings of various details of the filtration plant, building the necessary buildings, erecting a derrick, excavating and making forms for the clear-water reservoir, building the substructure of a gatehouse, laying pipe lines between the gatehouse and the clear-water reservoir, and excavating for the intake for the pumps to supply water to the filter beds. A topographical survey of the site for the filtration plant was also begun. Four 48-inch pipe lines were laid from the east shaft gatehouse of the new reservoir to the filtration gatehouse.

There is submitted herewith a copy of the report of the Board of engineer officers convened by order of the Secretary of War to select a proper site for the filtration beds for the water supply of the District of Columbia.

As Congress has stipulated that the slow sand system of filtration shall be adopted, an estimate of $1,000,000 is submitted to continue the work during the fiscal year ending June 30, 1903.

### *Money statement.*

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT.

| | |
|---|---|
| July 1, 1900, balance unexpended | $200,000.00 |
| Amount appropriated by act of March 1, 1901 | 500,000.00 |
| | 700,000.00 |
| June 30, 1901, amount expended during fiscal year | 666,269.60 |
| July 1, 1901, balance unexpended | 33,730.40 |
| July 1, 1901, outstanding liabilities | 8,944.98 |
| July 1, 1901, balance available | 24,785.42 |
| Amount (estimated) required for completion of existing project | 1,786,123.42 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903, in addition to the balance unexpended July 1, 1901 | 1,000,000.00 |

## APPENDIX I.

### REPORT OF BOARD OF ENGINEER OFFICERS.

OFFICE OF THE WASHINGTON AQUEDUCT,
*Washington, D. C., April 24, 1901.*

GENERAL: The Board of officers of the Corps of Engineers, convened by Special Orders, No. 13, Headquarters, Corps of Engineers, United States Army, dated Washington, D. C., April 11, 1901, has the honor to submit the following report:

The order convening the Board is as follows:

Special Orders, No. 13.

HEADQUARTERS, CORPS OF ENGINEERS,
UNITED STATES ARMY,
*Washington, April 11, 1901.*

By authority of the Secretary of War, a Board of officers of the Corps of Engineers, to consist of—

Lieut. Col. Alexander M. Miller,
Capt. Lansing H. Beach,
Capt. David D. Gaillard,
First Lieut. George M. Hoffman, recorder,

will assemble at Washington, D. C., Thursday, April 18, 1901, or as soon thereafter as practicable, upon the call of the senior member, to select a proper site for the filtration beds for the water supply of the District of Columbia.

Upon the completion of the duty assigned them, the members of the Board will return to their proper stations.

The journeys required under this order are necessary for the public service.

By command of Brigadier-General Wilson.

CHAS. S. BROMWELL,
*Captain, Corps of Engineers.*

The following letter was received from the Office of the Chief of Engineers:

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
*Washington, April 18, 1901.*

COLONEL: I have the honor to inclose herewith certain papers relating to the subject of sites for filtration beds for the water supply of the District of Columbia, which may prove of use to the Board convened by Special Orders, No. 13, Headquarters, Corps of Engineers. Please return these papers to this office when they have served their purpose.

In this respect I am directed to state that it is the wish of the Chief of Engineers that the inquiry shall be broad and thorough, and that, keeping in view a wise economy, the site recommended for selection shall be the best in the light not only of present conditions but also of the probable future development of the systems of water supply and water distribution of the District of Columbia.

By order of the Acting Chief of Engineers.

Very respectfully, your obedient servant,

JAS. L. LUSK,
*Major, Corps of Engineers.*

Lieut. Col. A. M. MILLER,
*Corps of Engineers, Washington, D. C.*

In accordance with the foregoing order, a meeting of the Board was called by the senior member to meet at the office of the Washington Aqueduct, 2728 Pennsylvania avenue, Washington, D. C., at 10 a. m., April 18, 1901.

The Board met accordingly and continued with daily sessions, except Sunday, as per minutes of proceedings hereto attached.

A large number of sites were offered for the consideration of the Board. Many of these were rejected on account of their general unsuitability for the purpose, due to location, topographical features, or engineering difficulties to be overcome.

The Board has visited all the sites that a study of the question indicated as available.

The result has been the elimination of all proposed sites except three, all of which have been prominently mentioned as available for the location of filter beds. These are:

Site 1. That known as the "Stubblefield" site, which is situated 3½ miles from Great Falls and 12 miles from the new reservoir.

Site 2. That to the north of the new reservoir and bounded by the Soldiers' Home grounds, Whitney avenue, "Bellevue" subdivision, Seventh street, Morris street, and the new reservoir land.

Site 3. That to the east of the new reservoir and bounded by the Soldiers' Home grounds, North Capitol street, Cincinnati street, First street, Baltimore street, and the new reservoir land.

A map[1] is forwarded herewith showing the location of sites 2 and 3, and marked Appendix "A."

Site 1. "Stubblefield."—The advantages of this site are, first, the great area available for filter beds and auxiliary constructions, and, second, the low cost of land. Its disadvantages are, first, that to afford the same amount of sedimentation as that afforded by the reservoirs now in use or under construction, there would be required a basin or basins 92 acres in area and 20 feet deep; second, there is no railroad or electric road over which coal, sand, and construction materials could be transported to the site, and in case the Chesapeake and Ohio Canal should be discontinued—and in any case during the winter—the only means of transportation from Washington to this site would be by wagon, with a haul of about 11 miles; third, after filtration the water would have to be carried through 12 miles of masonry conduit before reaching the new distributing mains. Not only would there be risks of deterioration and contamination by infiltration, but the water lost by leakage en route would have a greatly increased value, due to the cost of the process of filtration through which it had passed.

As the above objections largely outweigh, both practically and economically, any advantages accruing from the low price of land and the large area available, the Board is of the opinion that this site should not now be considered for the location of the filter beds.

Site 2.—North of new reservoir. There are no engineering difficulties to prevent the establishment of the filter beds at this site. Considering as a whole the problems of supplying water to the filter beds and to those areas of the city which can not be supplied by gravity, the most economical arrangement has been determined to be the combination, in a single pumping station, located at the north end of the reservoir, of all pumps needed for the two purposes. Owing to the elevation of the clear-water basin designed for this site (175 feet above datum), all areas below 95 feet above datum could be served efficiently from this basin by gravity.

With this arrangement an auxiliary pumping station in the vicinity of Trumbull and College streets is needed to supply the high-service pumps with water from the present distributing system if for any reason the tunnel should be thrown out of service and the new reservoir empty at the same time.

An estimate is submitted for the construction of filter beds of a net filtering area of 26.92 acres, and the purchase of sufficient land (47.3 acres) to provide for an increase of the net filtering area to 33.2 acres. This last area is believed to be sufficient to filter the maximum amount of water that can be efficiently supplied by the present conduit from Great Falls, i. e., about 76,000,000 gallons in twenty-four hours. The purchase of 2 acres more than at site 3 has been provided for at this site, the additional amount being needed as a site for the pumping station. With filter beds at site 3 the pumping station would be placed on land already owned by the United States.

### *Estimate 2 A.*

#### ESTIMATE OF FILTER PLANT NORTH OF RESERVOIR.

| | Feet above datum. |
|---|---|
| Water in filters | 185 |
| Foundation of filters | 176.5 |
| Water in clear-water basin | 175 |
| Bottom of clear-water basin | 162 |

| | |
|---|---|
| Land—2,060,556 square feet, 47.3 acres (including streets) | $520,182.80 |
| Grading, 879,390 cubic yards, at 30 cents | 263,907.00 |
| Sand for filter beds, 139,000 cubic yards, at $2 | 278,000.00 |
| Gravel for filter beds, 43,500 cubic yards, at $2 | 87,000.00 |
| Concrete in walls, 18,600 cubic yards, at $5.50 | 102,300.00 |
| Concrete in floors and drains, 23,700 cubic yards, at $6 | 142,200.00 |
| Flagging for main drains, 5,400 square yards, at $2 | 10,800.00 |
| Tile for lateral drains, 85,000 feet, at 10 cents | 8,500.00 |

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[1] Not printed.

| | |
|---|---|
| Cast-iron piping, 2,900 tons, at $30 | $87,000.00 |
| Laying same | 20,000.00 |
| Influent and effluent houses | 66,000.00 |
| Clear-water basin | 130,000.00 |
| One-half cost laying four 48-inch mains | 32,830.00 |
| Laboratory and office | 6,000.00 |
| Sand washers and piping | 8,000.00 |
| Cleaning up | 10,000.00 |
| Covering filter beds | 482,100.00 |
| Cross connection in reservoir for circulating conduit | 10,600.00 |
| Intake tower | 23,940.00 |
| Engineering and contingencies | 176,917.70 |
| Total | 2,466,277.50 |

Site 3.—East of new reservoir. Some work has already been done on this site in accordance with an approved project, and therefore only the cost of completing the filter beds has been considered.

As at site 2, there are no engineering difficulties to prevent the establishment of filter beds at this locality.

Owing to the lower elevation of the water level in the clear-water basin (149 feet above datum), only areas lower than 70 feet above datum could be efficiently supplied by gravity from this basin. All areas above this level would have to be supplied by pumping.

An estimate is submitted for the construction of filter beds at this site providing for a net filtering area of 26.92 acres, and the purchase of sufficient land (45.3 acres) to increase the net filtering area to 33.2 acres, thus making it of the same capacity as the filter beds at site 2 and allowing for the same future extension.

### *Estimate 3A.*

#### ESTIMATE OF FILTER PLANT EAST OF RESERVOIR.

| | |
|---|---|
| Water in filters ....feet above datum | 169 |
| Foundation of filters ....do | 160.5 |
| Water in clear-water basin ....do | 149 |
| Bottom of clear-water basin ....do | 136 |
| Land, 45.3 acres (including all streets except First and Detroit between Reservoir and First) | $650,390.88 |
| Grading, 731,000 cubic yards, at 30 cents | 219,300.00 |
| Sand for filter beds, 139,000 cubic yards, at $2 | 278,000.00 |
| Gravel for filter beds, 43,500 cubic yards, at $2 | 87,000.00 |
| Concrete walls, 18,600 cubic yards, at $5.50 | 102,300.00 |
| Concrete floors and drains, 23,700 cubic yards, at $6 | 142,600.00 |
| Flagging for main drains, 5,400 square yards, at $2 | 10,800.00 |
| Tile for lateral drains, 85,000 feet, at 10 cents | 8,500.00 |
| Cast-iron piping, 2,900 tons, at $30 | 87,000.00 |
| Laying same | 20,000.00 |
| Influent and effluent houses | 66,000.00 |
| Clear-water basin | 130,000.00 |
| One-half cost laying 48-inch mains | 32,830.00 |
| Laboratory and office | 6,000.00 |
| Sand washers and piping | 8,000.00 |
| Cleaning up | 10,000.00 |
| Covering filter beds | 482,100.00 |
| Engineering and contingencies, 10 per cent | 169,003.00 |
| | 2,509,423.88 |
| Already expended on this project | 107,381.34 |
| Total to complete | 2,402,042.54 |

Estimates 2A and 3A include only the purchase of the land and construction of filter beds and accessories for the two sites in question.

To make them fairly comparable, there is considered the relative cost of the necessary connections with the distributing system and the total relative cost of all pumping in each case, both to supply filter beds and all areas up to 95 feet above datum.

At the request of the Board, Mr. W. A. McFarland, superintendent of the water department of the District of Columbia, prepared an estimate covering the relative cost of connections and pumping at sites 2 and 3. The estimate is made on the basis of the type of pump believed to be best adapted for the work in each case, and with provision for pumping the increased amount when the total consumption shall have reached 76,000,000 gallons per day.

All differences in the cost of operating expenses, coal consumption, depreciation, etc., have been capitalized at 3 per cent. Mr. McFarland's[1] report is hereto attached, marked Appendix B. The conclusions drawn from it are summarized as follows:

### *Estimate B.*

RELATIVE COST OF CONNECTIONS AND PUMPING AT SITES 2 AND 3.

| | In favor of— | |
|---|---|---|
| | Site 3 (east site). | Site 2 (north site). |
| First cost of pumps and electric lighting for filters | $185,000 | |
| First cost of auxiliary station | 30,000 | |
| Saving, cost of distribution machinery | | $110,000 |
| Coal, pumps for filters | 31,733 | |
| Coal, pumps for distribution | | 164,500 |
| Attendance | | 274,000 |
| Depreciation | 145,000 | |
| Trunk mains | 124,400 | |
| Distribution | | 30,000 |
| | 516,133 | 578,500<br>516,133 |
| Difference in favor of site 2 (north site) | | 62,367 |

RÉSUMÉ.

| | |
|---|---|
| Cost of filter beds, etc., at site 2 (as per Estimate 2A) | $2,466,277.50 |
| Cost of filter beds, etc., at site 3 (as per Estimate 3A) | 2,402,042.54 |
| Difference in favor of site 3A | 64,234.96 |
| Difference of cost of pumping in favor of site 2 (as per Estimate B) | 62,367.00 |
| Final difference in favor of site 3A | 1,867.96 |

The estimates which precede are based upon the acquisition of enough land at the present time to provide for filtering an amount of water equal to the capacity of the existing conduit at Great Falls, 76,000,000 gallons per day, and the Board strongly recommends that this amount of land be acquired.

In this event, as previously shown, the adoption of site 3 would effect a total net saving of about $1,867.98.

Should it be deemed best to provide at the present time only sufficient land for the filtration of 60,000,000 gallons per day, as was previously estimated by the officer in charge of the Washington Aqueduct, site 3 would be the cheaper by $109,825.98.

It will be seen by what precedes that so far as engineering features and cost of completed filter beds are concerned, sites 2 and 3 differ but little from one another.

In case filter beds are located at site 3, computations show that two pumping stations would be necessary, one supplying water to the filter beds and the other to the distributing mains of the District of Columbia.

For site 2 the most economical and efficient arrangement, so far as pumping alone is concerned, would consist of a single pumping station at the north end of the new reservoir, supplying water both for the filter beds and for the distributing mains, supplemented by a small auxiliary station in the vicinity of Four-and-a-half and Trumbull streets, to be used only in the remote contingency of accident to the tunnel. Judging from past legislation it has apparently been the intention of Congress to intrust the construction and operation of filter beds to the direct control of the officer in charge of the Washington Aqueduct. The Commissioners of the District of Columbia have entire control of the pumping plant furnishing water for the higher areas of the District, and the expenditures relating thereto are paid from the water fund of the District of Columbia, while in the case of the Washington Aqueduct they are paid one-half by the United States and one-half from the revenues of the District of Columbia.

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[1] Not printed.

As the successful operation of the filters depends largely upon the rate at which the water is furnished to the filters by the pumps, it would not appear expedient to place the control of these pumps and the filter beds under different jurisdictions. Still less would it appear expedient to provide one pumping plant subject to two independent jurisdictions.

Owing to conditions prevailing the establishment of separate pumping plants at site 2 would be more expensive than at site 3, and when the cost of operation of separate plants at site 2 is considered their establishment at this site is deemed impracticable from an economic standpoint.

In reaching its decision the Board has kept in mind the fact that at the present rate of consumption the capacity of the aqueduct, 76,000,000 gallons per day, will be reached before many years, and that arrangements must be made for an increased supply, but as the furnishing of this additional supply involves the construction of a second conduit, with its necessary adjuncts, it is believed that provision for filtering this supply can best be made in connection with the construction of this conduit and its accessories.

In considering the subject of location the Board has only estimated for a plant operated under the slow sand filtration method.

In case a method of filtration combining the slow sand and coagulation were adopted, provision should be made for a coagulating basin. In case of selection of either site, north or east of the new reservoir, the most economical and practical method of providing for coagulation would be to utilize a part of the new reservoir. This would be equally available for either site and the cost would be the same.

The Board having carefully considered all the questions involved, have the honor to recommend that the filter beds be located on site 3, to the east of the new reservoir, and that squares 26, 27, 29, and 30, in Edmonston and Stellwagen's addition of Le Droit Park, and squares 13, 14, 15, 16, and 39 of Dobbins' addition be secured for this purpose.

Respectfully submitted.

A. M. Miller,
*Lieutenant-Colonel, Corps of Engineers.*
Lansing H. Beach,
*Captain, Corps of Engineers.*
D. D. Gaillard,
*Captain, Corps of Engineers.*
G. M. Hoffman,
*First Lieutenant, Corps of Engineers, Recorder.*

The Chief of Engineers, United States Army.

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Office of the Chief of Engineers,
United States Army,
*Washington, April 27, 1901.*

Sir: I have the honor to submit herewith the report, dated the 24th instant, of the Board of Engineer officers, convened in accordance with your authority to select a proper site for installing filtration beds for the water supply of the District of Columbia.

The Board was formally notified that "it is the wish of the Chief of Engineers that the inquiry of the Board shall be broad and thorough, and that, keeping in view a wise economy, the site recommended for selection shall be the best, in the light not only of present conditions, but also of the probable future development of the systems of water supply and water distribution of the District of Columbia."

The Board reports that many sites were offered for its consideration, most of which were rejected owing to their general unsuitability for the purpose, due to location, topographical features, or engineering difficulties presented.

Three sites finally remained for close comparison, each of them having been prominently mentioned for the purpose contemplated. These sites are as follows:

*Site 1.*—That known as "Stubblefield," located in the State of Maryland, 12 miles from the new reservoir and 3½ miles this side of Great Falls.

*Site 2.*—That to the north of the new reservoir and bounded by the Soldiers' Home grounds, Whitney avenue, the Belleview subdivision, Seventh street, Morris street, and the new reservoir land.

*Site 3.*—That to the east of the new reservoir and bounded by the Soldiers' Home grounds, North Capitol street, Cincinnati street, First street, Baltimore street, and the new reservoir land.

Sites 2 and 3 are shown on the accompanying[1] map, marked Appendix "A."

After a careful consideration of all the features of the case, which are discussed in detail in the report, the Board recommends that the filter beds be located on site 3, to the east of the new reservoir, and that squares 26, 27, 29, and 30, in Edmonston and Stellwagen's addition to Le Droit Park, and squares 13, 14, 15, 16, and 39 of Dobbins' addition, be secured for the purpose.

The squares in question are shown on E. D. 351 of 7335, herewith, and have been tendered at 45 cents per square foot, which is considered a reasonable price, and probably as low as can be obtained by condemnation proceedings.

I concur in the recommendation of the Board.

Very respectfully, your obedient servant,

John M. Wilson,
*Brig. Gen., Chief of Engineers, U. S. A.*

Hon. Elihu Root,
*Secretary of War.*

[First indorsement.]

War Department, *April 30, 1901.*

The recommendation of the Board of Engineer officers, as contained in its report of the 24th instant and concurred in by the Chief of Engineers, is approved.

Elihu Root,
*Secretary of War.*

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[1] Not printed.

# APPENDIX D D D.

## IMPROVEMENT AND CARE OF PUBLIC BUILDINGS AND GROUNDS IN THE DISTRICT OF COLUMBIA—WASHINGTON MONUMENT.

### *REPORT OF COL. THEO. A. BINGHAM, UNITED STATES ARMY, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

Office of Public Buildings and Grounds,
*Washington, D. C., July 19, 1901.*

General: I have the honor to submit the following report of operations upon public buildings and grounds in the District of Columbia, under the Chief of Engineers, during the fiscal year ending June 30, 1901:

In addition to the public buildings and grounds, this office has also been charged with the care and repair of the Government telegraph lines connecting the Capitol with the various departments and the Government Printing Office; of the repair of the building on Tenth street NW., where Abraham Lincoln died; of the construction of the statue of Gen. John A. Logan and of the ceremonies incident to its unveiling on April 9, 1901; of such matters connected with the erection of the statue of General Sherman as may properly devolve upon the War Department; of the monument at Wakefield, Virginia, the birthplace of Washington, and the iron-pile dock erected under the supervision of this office in 1894, under the direction of the Department of State, at the mouth of Bridge Creek, Virginia; of the erection in the national military park at Gettysburg, Pa., of the memorial tablet to Abraham Lincoln; of the preservation, care, and safety of buildings occupied by the War Department in the District of Columbia, except State, War, and Navy Department building; of the banks of the Potomac River from the north line of the Arsenal grounds to the southern curb line of N street; of the work of continuing plans for extending the Executive Mansion; of the work of making an examination and reporting plans for the treatment of that section of the District of Columbia situated south of Pennsylvania avenue and north of B street SW., and for a suitable connection between the Potomac and Zoological parks; since March 6, 1901, executive and disbursing officer of the Grant Statue or Memorial Commission; and since May 4, 1901, executive and disbursing officer of the McClellan Statue Commission.

## PUBLIC BUILDINGS.

### EXECUTIVE MANSION, GREENHOUSES, CONSERVATORY, AND STABLE.

*Care, repair, and refurnishing.*—The usual care was given to the Mansion and its furniture. Repairs were made to furniture, and some new furnishings, linen, silverware, and glassware purchased. In the early autumn of 1900 all carpets were relaid, lace curtains, window draperies, and door portières hung, and the house placed in order for the winter. The awnings were removed from the windows in the autumn and replaced in the spring. In May, 1901, the carpets were taken up, cleaned, and stored, the lace curtains and draperies removed from the windows, the laces laundered, the draperies cleaned, and all packed away for the summer. New cocoa matting was laid on stairways and landings leading to office rooms. Twenty-three new window shades were purchased and hung, new binding placed on floor matting, the canvas window awnings and those used on south portico repaired. The electric elevator and its appliances were overhauled and cleaned, the elevator motor and electric pump cleaned and painted, the woodwork of car and of the wood and wire screens on landings were refinished, and the guide rails, gearing, and safety appliances cleaned and oiled. New carpet was placed in the car and elevator hall.

*Painting.*—The columns, caps, cornices, and ceilings of north and south porticos, the window sills, sashes, and the walls of Mansion under porticos, the stone coping at base, the balustrade around the roof of north portico, the storm house at north entrance, the posts connected with iron railing at north front, and the stone coping of the railing, the tin roof covering, and the wooden platforms, stairway and flagpole on same, some of the woodwork in elevator shaft, partitions, doors, and door frames, sashes, window frames, and a storeroom in the attic have been painted, all door sills refinished, and some minor miscellaneous painting and whitewashing done.

*Electric work, lighting, and plumbing.*—All electrical appliances were maintained in proper condition, necessary repairs and minor alterations having been made as required. Some defective electric-light cable was removed and replaced with new cable. All of the glass on the crystal chandeliers on first floor and the glass globes on all chandeliers and brackets were taken off, cleaned, and replaced. The twelve glass disks, which cover the electric lights on ceiling of east room, and all other chandeliers and brackets in the Mansion were cleaned, and burned-out electric lamps replaced with new lamps. New wires were run in the northeast (or terra cotta) bedroom, and two side brackets, with one electric light each, placed in position. Necessary wires were run and an additional electric call bell placed on second floor. The arrangement of water pipes, waste pipes, and soil pipes in the central shaft in building was improved by removing the old pipes and replacing them in a simpler and better way with new pipe. The old 4-inch cast-iron soil pipe was replaced with a 4-inch wrought-iron pipe, with Durham fittings, and 70 feet of old soil pipe and 364 feet of old water pipe were removed and replaced with 90 feet of new soil pipe and 232 feet of new water pipe. The new pipes were painted in different colors, so as to be more readily distinguished. A new galvanized-iron sink was placed on second-floor landing of elevator shaft and connected with water-supply and drain pipes. An additional hot and cold water pipe was run into one of the toilet rooms. The large water filter in basement was thoroughly cleaned and repacked, and the large wooden supply tank in attic, the one on the roof, and the small flush tanks were cleaned, and minor repairs made to plumbing fixtures. The nickel-plated fixtures in toilet rooms were removed, replated, and replaced.

*Telephone and fire-alarm systems.*—The automatic telephone system between the Mansion and the Executive Departments was extended by connecting the Office of the Adjutant-General United States Army thereto. An automatic fire-alarm system was placed in the attic, with connections to street fire-alarm box and warning signals to the front door of Mansion. The system consists of three standard thermometers with electrical contacts, one at the east end, one at the west end, and one under the floor in the center of the attic, the connections being so arranged that notice will be given when the temperature has reached a certain degree (125°), and if it continues to rise will, when reaching a certain higher degree (200°), automatically spring the street box.

*Official social functions.*—The storm house used at red parlor window as an entrance and the exit bridge used at one of the windows on north front during official receptions, were painted, new linen floor crash purchased for laying over carpets at those functions, and new linen crash purchased and fitted to floor of east room for protecting carpet when workmen are engaged in decorating the room with plants. New wires were run and an outlet placed in floor of main corridor, first floor, for supplying current for lamps used for decorative purposes at state dinners. The canvas canopies, exit bridge, and storm doors were erected for a reception on New Year's Day and for an afternoon reception on February 20, 1901. Cloak boxes were placed in position and the east room and parlors were decorated with plants for the centennial exercises at the Mansion on December 12, 1900, and the east room and parlors and lower main corridor elaborately decorated with plants and cut flowers for state dinners on five occasions, as follows: December 5, 1900, January 2, February 14 and 19, and April 25, 1901.

*Basement.*—The main corridor, fourteen rooms and passages, the area walls on north front and under north and south porticoes were whitewashed or calcimined as required, and the large hot-air pipe in the laundry and part of the basement stairs were painted. The old range in small kitchen was removed and a new range purchased and set in position, all necessary brickwork and tile work in connection therewith completed, and the old hot-water iron boiler removed and replaced with a new 82-gallon boiler of galvanized iron. The steam pump in engine room was overhauled, necessary repairs made, worn-out parts replaced with new parts, and 47 feet of 2-inch water pipe run from the pump up to the north portico for attaching hose for use in washing about the front of Mansion.

*East room.*—Parts of the white woodwork were repainted or touched up, portions of ornamental gilding on same and parts of the eight mirror frames regilded and broken places on the decorated ceiling restored. The large portraits were removed from the walls, new fastenings and hanging wires placed on them, the heavy frames repaired and regilded where necessary, and the portraits rehung. The old straw matting was taken up and replaced with new matting.

*The southeast or green parlor.*—The woodwork was retinted and the two large window grills regilded.

*The southwest or red parlor.*—The woodwork was refinished and a new carpet purchased and laid.

*State dining room.*—One of the large mirrors was taken down, its frame strengthened and repaired and the mirror rehung. The old floor matting was taken up and replaced with new matting, and twelve new leather-covered mahogany chairs purchased.

*Private dining room.*—The switch which controls the electric lights in chandelier heretofore located on the second floor was removed therefrom, placed on the side wall of room and the necessary connections made. The wires which supply the electric lights on the walls were removed from the plaster and placed in tubes. The room was repapered, redecorated, and the woodwork repainted and new floor matting laid.

*Anteroom, first floor.*—The wooden wainscoting was gone over and touched up where necessary and the floor of the room refinished.

*Corridor, first floor.*—In the main corridor the ceiling and walls have been repainted, the gilded ornamentation of same regilded and broken glass in the decorated glass screen between this corridor and the entrance vestibule replaced with new glass. All of the pedestals of busts and the flower stands have been re-covered in plush and the furniture reupholstered and re-covered with new silk tapestry. The plaster molding of the frames of the large portraits, seven in number, hanging in this corridor was repaired and the frames regilded. In the west end of the corridor the old paint on door frames, windows, and washboards, and on the woodwork of the two stairways, and the landing leading therefrom to the second floor was burned off, all defaced places repaired, and the woodwork repainted in light colors. New carpet was purchased for the stairways and landing and new floor matting laid. All of the old wooden shoeing at the base of the washboards around both parts of this corridor was replaced with new shoeing. In the elevator hall opening from the main corridor some old defective flooring was taken up, the joist straightened, and new flooring laid. The large door between this hall and the anteroom adjoining was taken down, reconstructed, and rehung. The old paint on this door and on the door frames and washboards was burned off, the woodwork repainted in light colors and the door grained. A new carpet was laid in this hall and on the floor of elevator car.

*The northwest bedroom.*—The frame of the large mirror was regilded. New silk lining was placed on the window draperies. The side walls of the large bathroom east of this room were painted.

*The northwest dressing room.*—The window draperies were relined with new silk. The bathroom in this apartment was repapered and the woodwork of the room repainted.

*The southwest or green bedroom.*—The frieze and cornice which were water stained were repaired.

*Southwest dressing room.*—The room was repapered and the woodwork repainted.

*Southwest bathroom.*—The ceiling was cleaned and recalcimined.

*Corridor, second floor.*—Portions of the ceiling paper which had become loosened were repaired. Fourteen doors were taken down, the old varnish removed, and the doors refinished and rehung with new cast-brass hinges. A suite of new Turkish upholstered furniture was purchased for the west end of the corridor, the old floor matting at that end replaced with new matting, and a new silk drapery placed at the west window. The woodwork of the elevator hall opening from this corridor was painted.

*Executive Office rooms.*—The old paint was burned from window frames, sashes, shutters, door frames, and washboards in the two rooms on north front; the office corridor adjoining and the hall in front of Cabinet room, and the work repainted in a light color. Five slat doors to rooms were also painted. The location of the electric lights in the large office room was changed, necessitating the addition of one light. A new electric call-bell system, connecting all the office rooms and hallways with the entrance at north front of Mansion, was placed in position. The second flight of the stairway leading to the office rooms, having shown signs of weakness, the treads and risers were taken off, the plastering of the ceiling under the stairs removed, and an examination made. The outside carrier was found to be in an unsafe condition and was taken out and replaced with a 6 by 12 Georgia pine stringer. The new carrier was hung in steel stirrups at the top and bottom of the flight. The other carriers were leveled up and refastened, new treads and risers put on, the underside of the stairway replastered and repapered, and necessary painting and varnishing done. A portion of the cornice of the stairway was washed off and calcimined. The woodwork in the hall at foot of this stairway, consisting of window and door frames, door, shutters, sashes, and washboards, was painted.

Sundry civil act, approved April 17, 1900 (p. 12), provides—

> And hereafter, a complete inventory, in proper books, shall be made annually by the steward, under the direction of the officer in charge of public buildings and grounds, of all the public property in and belonging to the Executive Mansion, showing when purchased, use to which applied, cost, condition, and final disposition, to be submitted to Congress with annual report of the officer in charge of public buildings and grounds.

Owing to the impossibility of ascertaining for past years all the facts called for by the law, the list which is given this year (hereto appended as Appendix A) is not fully complete. It is hoped, however, that in the future it will be possible to make these lists more and more complete, as contemplated by the law.

### EXTENSION OF EXECUTIVE MANSION.

By sundry civil act, approved June 6, 1900, an appropriation of $6,000, or so much thereof as might be necessary, was made for "Continuing plans for extending the Executive Mansion, prepared in the office of the engineer officer in charge of public buildings and grounds, for completion of drawings, model, and specifications, and for each and every purpose connected therewith."

Work was at once begun on the drawings necessary for construction bids. During the previous three years considerable time and thought had been given to the solution of the problems involved.

On December 12, 1900, in connection with ceremonies arranged for celebrating the centennial of the occupation of Washington as the capital city, a model of the proposed extension was exhibited in the east room of the Executive Mansion before the President, Cabinet, members of Congress, governors, and other distinguished citizens. The model was accompanied by a number of exhibition drawings, and all were explained in an address by the officer in charge of public buildings and grounds.

The drawings, numbering 47, were completed in March, 1901, traced and blue printed, and, with the accompanying specifications, were ready for use in April, 1901, and await further action by Congress.

Following is the estimate:

*Estimate, proposed extension of Executive Mansion.*

| | |
|---|---|
| Excavation, 10,000 cubic yards, at $1 | $10,000 |
| Concrete, 5,000 cubic yards, at $7 | 35,000 |
| Steel, 4,000,000 pounds, at 4½ cents | 180,000 |
| Floor system, 140,000 square feet, at 60 cents | 84,000 |
| Wooden floor finish, 140,000 square feet, at 50 cents | 70,000 |
| Walls, 8,600 cubic yards, at $41 | 352,600 |
| Windows, etc., 120, at $200 | 24,000 |
| Marble columns, 56, at $3,000 | 168,000 |
| Mechanical equipment | 80,000 |
| Painting and plastering | 30,000 |
| | 1,033,600 |
| Contingencies, 10 per cent | 103,360 |
| | 1,136,960 |

Capt. J. S. Sewell, Corps of Engineers, United States Army, in charge of construction of the new Government Printing Office, has kindly furnished me with the above figures of ruling market prices.

The address above referred to is herewith as Appendix B. It is thought of value as setting forth the limitations and difficulties of the problem and showing how certain solutions were attained and why they were adopted for the plan proposed.

### GREENHOUSES, EXECUTIVE MANSION.

Necessary repairs were made to the woodwork of the houses and all repaired work was painted. New lath shutters for shading the houses were made and all broken glass replaced with new glass. All boilers, flues, pipes, and chimneys were cleaned and repairs made to furnaces and smoke pipes. The old smokestack was removed from furnace of two of the houses and a new one of black iron erected. One of the old tin gutters was replaced with a copper gutter. Considerable whitewashing was done in furnace rooms, wood and tool houses, potting rooms, passageways, and walls of greenhouses. The interior and exterior of the orchid house and the propagating house were painted and some miscellaneous painting done. The usual care was extended to the large collection of plants and greenhouse flowering plants and bedding plants for the ornamentation of the grounds propagated. There were propagated 28,540 bedding plants, in 150 varieties and species, 5,000 bulbs for spring planting, 3,000 annual plants, and 600 water lilies for planting in fountain basins, and 17,440 bulbs were purchased under contract for forcing in the houses and for planting in the grounds for early spring bloom.

### CONSERVATORY, EXECUTIVE MANSION.

Repairs were made to the old wooden superstructure, the work consisting of putting in new rafters, posts, wall plates, panels, facia of benches, moldings and casing, and repairing sashes. Gutters were relined with new tin where required and some new down spout put in place.

The interior and exterior of the entire superstructure were repainted, broken glass replaced with new glass, and all of the glass on the outside of east end puttied with thick white lead and whiting to prevent leaks. Repairs were made to the electric-light wires and sockets, and all old lamps replaced with new lamps where necessary. Some whitewashing was done to portions of the substructure. Repairs were made to a portion of the asphalt road west of the building and the iron fence at that side was repaired and one section reset.

### STABLE, EXECUTIVE MANSION.

.Considerable work in the way of repairs was done about this building. New double tongued and grooved floors were laid in thirteen stalls, about 34 feet of new mop board put down, the position of a feed box and watering trough changed, an old wooden sink removed and replaced with an iron sink with new waste pipe and trap. All the holes in floors of coach houses were plugged and patched, and all newly repaired woodwook painted. The walls, ceiling, and stalls in stall room and the walls and ceiling of small hall adjoining were painted. Repairs were made to water pipes, gas pipes and fixtures, and 84 feet of new gas pipe run to replace some that was too small. New closets were constructed in the harness room; window frames, sashes, walls, ceiling, partitions, etc., painted, and a two-light gas pendant placed in center of room. The old wooden manure pit in rear of building was torn out, a new pit with brick walls and a wooden top constructed, an old cobblestone apron at back door torn up and a new one of asphalt blocks covering an area of about 8 square yards laid, and about 50 linear feet of stone gutter taken up and reset. The gas lamp at west end of west coach house was taken down and placed out in center of the room.

### STABLE, PUBLIC BUILDINGS AND GROUNDS.

Necessary repairs were made to this building which stands in the rear of the stable of the Executive Mansion. New double tongued and grooved floors were laid in five stalls, the wash floor in carriage house taken up, several decayed floor stringers taken out and replaced with new material, and a new floor of 2-inch tongued and grooved Georgia pine laid. Two new door sills were put down and two old wooden mangers torn out and three cast-iron corner feed boxes put in place. All repaired woodwork was painted, the small windows at head of stalls rehung so as to open outward, broken window glass replaced with new glass, and the glass in thirteen sashes reputtied. A new tin roof, galvanized-iron gutters and spouting were put on the main building and painted, and the tin roof, gutters, and spouting on the addition were painted. Connections were made for supply and waste pipes to wash basin in harness room, and minor repairs made to water pipe, plumbing fixtures and gas fixtures. The old wooden platform in front of stable was taken up and replaced with a pavement of old asphalt blocks, covering an area of 30 square yards.

### HOUSE NO. 516 TENTH STREET NW., WHERE ABRAHAM LINCOLN DIED.

This property was purchased by the United States in November, 1896, since which date it has been under the supervision of this office.

The only work done during the year was the placing of a new down spout on the rear addition, the repair of down spout on front of main building, and of the tin flashing over the front door.

By authority of the Secretary of War, dated October 9, 1899, Mr. O. H. Oldroyd is allowed to occupy this building, with his family, as custodian without pay, and to exhibit his Lincoln Museum and to charge a small entrance fee therefor.

### BUILDINGS OCCUPIED AS OFFICES BY THE WAR DEPARTMENT, EXCEPT STATE, WAR, AND NAVY DEPARTMENT BUILDING.

Under date of June 30, 1893, these buildings were placed under the charge of this office, so far as their preservation, care, and safety are concerned. They now consist of twelve buildings, as follows:

Army Medical Museum and Library, Seventh and B streets SW.
Ford's Theater building, 511 Tenth street NW.
Annex to Ford's Theater building, 509 Tenth street NW.
No. 610 Seventeenth street NW., Record and Pension Office, War Department.
Southwest corner of Seventeenth and F streets NW., office of depot quartermaster, United States Army.
No. 1725 F street NW., branch printing office, War Department.
No. 1712 G street NW., publication branch, Record and Pension Office, War Department.
No. 1744 G street NW., Ordnance Department, United States Army.
No. 1814 G street NW., Medical Department, United States Army.
Annex to Winder Building, Ordnance Department, United States Army.
War Department stables, G street, between Seventeenth and Eighteenth streets NW.
Lemon Building, No. 1729 New York avenue NW., occupied by supply division, War Department, etc.

Monthly inspections have been made of these buildings during the year, and they are believed to be in good and safe condition for the purposes for which they are being used.

### WASHINGTON MONUMENT.

The usual care was given to maintain the Monument and the electric-light system and steam-elevator machinery in good condition and to keep the interior of the shaft clean. The steam elevator was in operation daily, except on Sundays and holidays and days when repairs were in progress, for carrying visitors to the top from July 1 to December 18, 1900, after which date it could not be used by visitors, owing to work being in progress for the installation of a new electric elevator. Visitors were, however, allowed to ascend the shaft by the stairway from December 19, 1900, to January 10, 1901, when, as a matter of safety, the Monument was closed, because the workmen were engaged in taking down parts of the steam elevator. The Monument was again opened from January 21 to 25, 1901, on which latter date it was closed, as the presence of visitors was found to interfere with the workmen. On June 1, 1901, the Monument was again opened to visitors, who had to ascend by the stairway for the reason that while the new electric elevator was substantially completed it was not yet ready for operation.

The steam elevator and machinery were inspected once each month between July and November, 1900, by an agent of the builders, and pronounced in good and safe condition. Weekly inspections were also made by the steam engineers at the Monument, and tests of the safety appliances on the elevator car made daily by the employees before starting to carry passengers. On September 7 and October 5, 1900, the steam elevator was stopped for one-half day each, and on November 13, 1900, for one day, in order that some necessary work might be made to the boilers and steam pipes. The operation of the machinery was also suspended from September 24 to 26 to permit the usual quarterly inspection and cleaning of boilers. During this stoppage the belt on elevator engine was changed, valves packed, steam pipes repaired, and the boilers washed out, examined, and tested with cold-water pressure and the furnace walls of one boiler repaired.

Some miscellaneous repairs were also made about the Monument. In November, 1900, some necessary painting was done about the woodwork in boiler house, and in January, 1901, the work of placing channel irons and steel bars upon the tie rods of the iron columns within which the elevator car runs, in order to stiffen the rods and prevent them from buckling (a work temporarily suspended over a year ago), was recommenced and completed during that month. All of the tablets and other marble work in the Monument where possible have been cleaned. A new floor has been laid in the motor (formerly engine) room at the Monument, the woodwork in the room painted, a new hopper and flush tank placed in toilet room, and a cement floor laid there. In the boiler room new patches were placed on the crown sheets of both boilers, the walls of furnaces repaired, the brickwork around boilers pointed up, and two dampers placed in flues, so that one boiler can be used at a time. Two new injectors were put up and the location of a steam pump changed. A cement floor was laid in boiler room and ash room in place of the old brick floors, and a new door placed in boiler-room end of cable tunnel. Thirty new kerosene lanterns were purchased and placed in position in the interior of the Monument for use in lighting the shaft when the electric lights are not in operation, replacing old lanterns which had become unserviceable. The roof of the lodge house was repaired.

During June, 1901, the ironwork and woodwork at the top of the shaft and the ironwork from the bottom floor to the 140-foot landing were painted, new electric wires run and connections made from the bottom floor up to the 290-foot landing, and the work of changing from 70-volt to 110-volt electric lamps nearly completed. The walls and ceiling of boiler room were whitewashed, the steam pipes and fronts of boilers painted and magnesia covering placed on some of the steam pipes and connections.

The following table shows the number of visitors to the top of the Monument each month, both by the elevator and stairway, the total number during the year, and the aggregate number since the shaft was opened to the public, October 9, 1888:

| Month. | Number by the steam elevator. | Number by the stairway. | Total. | Aggregate since October 9, 1898. |
|---|---|---|---|---|
| 1900. | | | | |
| July | 9,922 | 2,019 | 11,941 | 1,871,773 |
| August | 12,038 | 4,198 | 16,236 | 1,888,009 |
| September | 8,937 | 4,025 | 12,962 | 1,900,971 |
| October | 11,178 | 3,716 | 14,894 | 1,915,865 |
| November | 8,395 | 2,318 | 10,713 | 1,926,578 |
| December | 5,129 | 5,051 | 10,180 | 1,936,758 |
| 1901. | | | | |
| January [a] | .......... | 1,848 | 1,848 | 1,938,606 |
| February [b] | .......... | .......... | .......... | 1,938,606 |
| March [b] | .......... | .......... | .......... | 1,938,606 |
| April [b] | .......... | .......... | .......... | 1,938,606 |
| May [b] | .......... | .......... | .......... | 1,938,606 |
| June [c] | .......... | 5,406 | 5,406 | 1,944,012 |
| Total | 55,599 | 28,581 | 84,180 | .......... |

[a] Steam elevator not running for visitors.

[b] Monument closed to visitors.

[c] Electric elevator not running for visitors.

### LEVELS AT WASHINGTON MONUMENT.

Bench mark, to which levels are referred, was established by the Coast and Geodetic Survey in April, 1899, and is 29.632 feet above mean sea level.

*Elevations of bench marks at corners of monument above mean level.*

| Date. | Northwest. | Northeast. | Southwest. | Southeast. | Remarks. |
|---|---|---|---|---|---|
| May 19, 1898 | 40.776 | 40.815 | 40.776 | 40.815 | |
| May 4, 1899 | 40.755 | 40.756 | 40.760 | 40.760 | Weather fair; seeing good. |
| June 5, 1899 | 40.722 | 40.739 | 40.724 | 40.727 | Very warm; seeing poor. |
| July 5, 1899 | 40.768 | 40.757 | 40.755 | 40.762 | Weather fair; seeing fair. |
| Aug. 9, 1899 | 40.752 | 40.758 | 40.755 | 40.765 | Levels taken in cool of evening. |
| Sept. 7, 1899 | 40.759 | 40.756 | 40.757 | 40.761 | Do. |
| October, 1899 | ........ | ........ | ........ | ........ | No levels taken. |
| Nov. 2, 1899 | 40.750 | 40.742 | 40.752 | 40.753 | Seeing good; weather cool. |
| Dec. 9, 1899 | 40.751 | 40.754 | 40.764 | 40.770 | Do. |
| Jan. 12, 1900 | 40.754 | 40.755 | 40.765 | 40.765 | Fresh northwest wind; seeing fair. |
| Feb. 10, 1900 | 40.752 | 40.756 | 40.752 | 40.763 | Cloudy and cold; seeing fair. |
| Mar. 23, 1900 | 40.769 | 40.768 | 40.768 | 40.771 | Fresh southwest winds; seeing fair. |
| Apr. 23, 1900 | 40.762 | 40.769 | 40.769 | 40.764 | Turned very warm after rain; seeing poor. |
| May 17, 1900 | 40.760 | 40.762 | 40.761 | 40.759 | Very warm; seeing poor. |
| June 13, 1900 | 40.760 | 40.754 | 40.759 | 40.758 | Cloudy, but warm; seeing good. |
| July 23, 1900 | 40.761 | 40.762 | 40.763 | 40.761 | Very warm; seeing fair. |
| Aug. 22, 1900 | 40.760 | 40.759 | 40.759 | 40.761 | Cool and cloudy; seeing very good. |
| Sept. 22, 1900 | 40.761 | 40.760 | 40.763 | 40.764 | Cool; seeing fair. |
| Oct. 25, 1900 | 40.754 | 40.753 | 40.760 | 40.762 | Warm and hazy; seeing fair. |
| Nov. 22, 1900 | 40.761 | 40.762 | 40.759 | 40.761 | Seeing good. |
| Dec. 31, 1900 | 40.762 | 40.772 | 40.763 | 40.772 | Seeing poor. |
| Jan. 31, 1901 | 40.762 | 40.762 | 40.762 | 40.768 | Do. |
| Feb., 1901 | ........ | ........ | ........ | ........ | No levels taken. |
| Mar. 26, 1901 | 40.760 | 40.759 | 40.759 | 40.761 | Seeing good. |
| Apr. 30, 1901 | 40.762 | 40.759 | 40.759 | 40.762 | Do. |
| May 29, 1901 | 40.761 | 40.760 | 40.760 | 40.761 | Do. |
| June 22, 1901 | 40.759 | 40.762 | 40.762 | 40.759 | Seeing poor. |

### ELECTRIC PLANT, WASHINGTON MONUMENT.

The sum of $26,500 was appropriated by Congress in the sundry civil appropriation act approved June 6, 1900, for replacing the steam elevator at the Monument by an electric elevator.

Bids for furnishing and installing the electric elevator and motor at the Monument and the generating unit at the boiler house were invited June 22, 1900, and opened July 14. The bids received were in excess of the appropriation, and they were rejected. Bids were again invited on September 22, 1900, and opened on October 22. Those received for the generating unit were rejected as being too high. The lowest responsible bid for the elevator, motor, etc., was accepted and a contract entered into for them on November 21, 1900, with the Marine Engine and Machine Company, of Harrison, N. J. A satisfactory bid for the generating unit was received on November 12, accepted November 21, and a contract entered into December 18, 1900, with the Crocker-Wheeler Company, of Ampere, N. J.

As the approved project for the work provided that the addition to the boiler house be erected by the United States, this office commenced the work of construction in September, 1900, and completed the addition in January, 1901, except the painting, which was finished in February. Congress, in the sundry civil act approved March 3, 1901, having made the appropriation for the "addition to boiler house," available for "the necessary water-pipe connections and for each and every purpose necessary to make the boiler house most effective for the elevator service," a water main, 1,600 feet in length, was laid from the public main on Fourteenth street through the Monument grounds to the boiler house, and all necessary connections made in the building, the work being done in May, 1901.

Work for the installation of the generating unit at the boiler house was commenced in February, 1901, and was practically completed by March 1. This machinary has been operated since then at various times for adjustment and test, both by itself and in connection with the elevator. It is hoped to complete this work of testing and adjustment so as to open the elevator to the public before the end of July.

The work of installing the cables for electric power and lights in the tunnel between the boiler house and the Monument was also performed by this office. On October 4, 1900, bids for the necessary cables were invited, opened October 15, proposal accepted November 10, and cables delivered at the Monument December 11. On April 25, when no longer needed, the elevator, boilers, and elevator engine were shut down, work commenced removing the main steam pipe from the tunnel and hauling it to the property yards at the propagating gardens, the work being completed in May, 1901. Work was immediately commenced putting up the insulators and attaching the cables, which were run into the motor room at Monument and the dynamo room at boiler house and properly connected. The old steam elevator engine was sold at auction on April 20 and removed from the engine room at Monument by the purchasers.

Work for the installation of the electric elevator in the Monument was commenced on December 13, 1900, and was to have been completed, under the terms of the contract, by April 3, 1901. In March the contractors applied for an extension of time to May 25, for reasons stated. Their request was granted, and the work was completed by them by May 22, on which day current was furnished them from the generating unit with which to run the elevator car for testing purposes. On June 10 the official test of the new elevator and its machinery was made; bags loaded with sand, a total weight of 6,000 pounds, being placed in the car for testing its strength and efficiency. The test was satisfactory, fulfilled the requirements of the contract, and after further trial and adjustment it is hoped the elevator will be opened to the public by the end of July.

Arrangements are now being perfected for regular inspections to be made of the elevator, as soon as opened to the public, by experts in the employ of a responsible insurance and casualty company.

*Calculated distribution of weights at the Washington Monument, since installation of electric elevator.*

| | Inner columns. | | | | Outer columns. | |
|---|---|---|---|---|---|---|
| | N. W. | N. E. | S. E. | S. W. | N. W. | N. E. |
| | *Tons.* | *Tons.* | *Tons.* | *Tons.* | *Tons.* | *Tons.* |
| 1. Former loads on top of columns | 2.25 | 2.65 | 6.29 | 9.42 | .......... | .......... |
| 2. Loads on top of columns, including old car, new counterweights, ropes, chains, sheaves, and beams | 5.8 | 9.2 | 6.1 | 6.7 | 3.1 | .......... |
| 3. Same as No. 2 with new car | 3.78 | 6.25 | 7.14 | 7.57 | 4.44 | 1.68 |
| 4. Load at base of columns, including weights of columns, channels, braces, old car, new counterweight, guides, and fastenings, ropes, chains, sheaves, etc | 28.3 | 24.5 | 27.8 | 19.7 | .......... | .......... |
| 5. Same as No. 4 with new car | 25.6 | 24.5 | 28 | 20.5 | .......... | .......... |
| 6. Safe load at base of columns, including columns | 40 | 40 | 40 | 40 | .......... | .......... |
| 7. Destructive load at base of columns | 180 | 180 | 180 | 180 | .......... | .......... |

### DATA RELATIVE TO WASHINGTON MONUMENT.

| | | |
|---|---|---|
| Height above mean low water | | 597 feet 3 inches |
| Height above doorsill | | 555 feet |
| Side of base | outside | 55 feet 1½ inches |
| | inside | 25 feet |
| Depth of foundation (sand and clay) | | 38 feet |
| Foundation, on a side | | 126 feet 6 inches |
| Area | | 16,002.25 square feet |
| Top, side of Monument | outside | 34 feet 6 inches |
| | inside | 31 feet 6 inches |
| Walls, thickness | base | 15 feet ¼ inch |
| | top | 18 inches |
| Weight of capstone | | 3,300 pounds |
| Weight of whole Monument | | 81,120 tons |
| Mean pressure at base | | 5 tons per square foot |
| Pressure on foundation nowhere greater per square foot than | | 9 tons |
| Near edges, less than | | 3 tons |
| (Coast Survey Report, December 1, 1884.) | | |
| Taper of Monument | | ¼ inch to 1 foot |
| Memorial stones (beginning at 30 feet, stopping at 280 feet) | | 179 |
| Steps | | 898 |
| Landings | | 50 |
| Windows, at top only | | 8 |
| Six are 3 feet by 1 foot 4 inches. | | |
| Two are 3 feet by 2 feet. | | |
| Cost | | $1,300,000 |
| Corner stone laid July 4, 1848. | | |
| Capstone set December 6, 1884. | | |
| Dedicated February 21, 1885. | | |
| Elevator, electric, time of travel | | 5 minutes |
| Elevator load | | 35 persons |
| Weight of car, empty | | 5,670 pounds |
| Weight of car, loaded, 35 persons (1 person equals 150 pounds) | | 10,920 pounds |
| Weight of counterweight | | 8,040 pounds |
| Cables | | 1½ inches diameter |
| Dynamo | | 50 kilowatts, 250 volts |
| Engine, double worm. | | |
| Speed of elevator, 100 feet per minute. | | |
| Engine governor throws off current at 105 feet per minute. | | |
| Car safety stops car at 150-feet speed per minute. | | |
| Elevator tested at 6 tons. | | |

### IMPROVEMENT OF PUBLIC RESERVATIONS IN THE DISTRICT OF COLUMBIA.

The work of this office is divided as follows:

1. Clerical department.
2. Horticultural department.
3. Engineering department.
4. Police department.
5. Executive Mansion, greenhouses and grounds.
6. Washington Monument.
7. Departmental telegraph.

For the purposes of administration all the parks under this office are divided into three divisions, viz:

East division, all east of North and South Capitol streets.

Northwest division, all west of North Capitol street and north of B street north.

Southwest division, all west of North and South Capitol streets, and south of B street north.

The area covered by the park spaces of the District of Columbia under the charge of this office is 407.21 acres.

There are, in all, 302 reservations, varying in size from 250 square feet to 82 acres.

These reservations are classified as follows:

| | Number. | Acres. |
|---|---|---|
| Highly improved | 107 | 353.29 |
| Partially improved | 72 | 25.95 |
| Unimproved | 123 | 27.97 |
| Total | 302 | 407.21 |

Of these—

Nine have granite coping.
Ninety-four have open, low, iron post-and-chain fences.
One hundred and four are marked by monument stones.
Ninety-five have no delimiting marks.

Between June 30, 1900, and June 30, 1901, one-half of the $20,000 appropriated by Congress for "improving various reservations" was devoted to unimproved ground and the first stage of improvement was accomplished on 20 reservations, comprising 3.169 acres, in various parts of the city, as shown in the table below and on the accompanying map.

This first stage of improvement consists of marking by stones, grading, introducing water, covering with soil, sowing with grass seed, planting with trees and shrubs, and, in some cases, inclosing with low, open, iron post-and-chain fences or wire fences.

*The following reservations were improved during the fiscal years given.*

| 1897-98. | | | | 1898-99. | | | | 1899-1900. | | | | 1900-1901. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unimproved. | | Previously partially improved. | | Unimproved. | | Previously partially improved. | | Unimproved. | | Previously partially improved. | | Unimproved. | | Previously partially improved. | |
| No. | Acres. | No. | Acres. | No. | Acres. | No. | Acres. | No. | Acres. | No. | Acres. | No. | Acres. | No. | Acres. |
| 85 | 0.173 | 29 | 0.329 | 61 | 0.050 | .... | .... | 19 | 3.020 | 61 | 0.050 | 78 | 0.108 | 57 | 0.055 |
| 207 | .073 | 81 | .338 | 140 | .160 | .... | .... | 47 | .025 | 154 | .273 | 79 | .027 | 62 | .320 |
| 211 | .105 | 193 | .215 | .... | .... | .... | .... | 77 | .353 | 163 | .176 | 124 | .224 | 64 | .315 |
| .... | .... | 194 | .131 | .... | .... | .... | .... | 98 | .198 | .... | .... | 159 | .152 | 188 | .085 |
| .... | .... | .... | .... | .... | .... | .... | .... | 99 | .112 | .... | .... | 160 | .058 | 206 | .111 |
| .... | .... | .... | .... | .... | .... | .... | .... | 100 | .141 | .... | .... | 165 | .056 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 102 | .097 | .... | .... | 166 | .072 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 122 | .365 | .... | .... | 190 | .148 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 123 | .394 | .... | .... | 191 | .131 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 125 | .414 | .... | .... | 192 | .196 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 126 | 2.102 | .... | .... | 201 | .507 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 134 | .216 | .... | .... | 209 | .103 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 163 | .176 | .... | .... | 230 | .375 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 187 | .092 | .... | .... | 251 | .250 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 195 | .288 | .... | .... | 259 | .124 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 206 | .111 | .... | .... | 260 | .088 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 208 | .085 | .... | .... | 266 | .131 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 210 | .249 | .... | .... | 267 | .145 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 211 | .105 | .... | .... | 271 | .015 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 212 | .094 | .... | .... | 277A | .259 | .... | .... |
| .... | .... | .... | .... | .... | .... | .... | .... | 213 | .076 | .... | .... | .... | .... | .... | .... |
| 3 | .351 | 4 | 1.013 | 2 | .210 | .... | .... | 21 | 8.713 | 3 | .499 | 20 | 3.169 | 5 | .886 |

## MARKING STONES.

The marking of reservations by planting at their corners granite stones marked "U. S." has been found a useful precaution, particularly for unimproved reservations, often preventing innocent trespass by owners of adjoining property. Since this plan was inaugurated in 1898, 104 reservations have been thus marked, requiring the placing of 368 stones, and of this number 70 reservations have been marked and 239 stones set during the fiscal year 1901.

These 70 reservations are as follows:

Nos. 57, 61, 65, 67, 78, 79, 81, 82, 83, 84, 86, 87, 98, 101, 122, 124, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 155, 159, 160, 163, 165, 166, 167, 168, 169, 177, 178, 182, 183, 184, 188, 190, 191, 192, 201, 206, 209, 210, 229, 230, 231, 232, 233, 234, 251, 255, 259, 260, 266, 267, 271, 300.

One hundred marking stones have been cut and squared and 78 lettered during the year. The stones recently prepared have had the letters "P. B. G." added, so that the inscription now reads "U. S. P. B. G."

### PARK CURBING.

It being the wish of Congress that the public parks should be as open as possible, all the former high iron fences have been removed except where absolutely needed. This has left the edges of the parks with an unfinished appearance which, in many cases, is very unsightly.

It has been found by experience that a simple stone curbing gives a pleasing finish, and is sufficient to preserve a neat border line between park and sidewalk. Lafayette square is an illustration.

Franklin Park, one of the prettiest and most frequented in Washington, suffers for lack of this. A simple but tasteful granite curb can be laid around it for $9,000 or less, and the appropriation of this amount is respectfully urged.

### PARK WATCHMEN.

By act approved March 3, 1901, Congress provided two much-needed additional day watchmen—one for Monument Park and one for grounds south of Executive Mansion—to go into effect July 1, 1901. These additions will add greatly to the efficiency of park protection.

The entire force will then consist of a sergeant and twenty-nine men, who have all been carefully chosen, and who, in spite of their small number, are doing effective work.

*Arrests made by park watchmen on public grounds from July 1, 1900, to June 30, 1901.*

| Month. | Forfeited bail. | Convictions—fined or sent to work-house. | Drunk—released when sober. | Bonds taken for good behavior. | Nolle pros. | Dismissed. | Returned to insane asylum. | Returned to House of Detention. | Escaped. | Total arrests. |
|---|---|---|---|---|---|---|---|---|---|---|
| 1900. | | | | | | | | | | |
| July | 6 | 10 | 1 | | | | | | | 17 |
| August | 8 | 4 | 4 | 2 | | | | | | 18 |
| September | 12 | 8 | 7 | 1 | 1 | | | | | 29 |
| October | 8 | 11 | 11 | 1 | | | | | | 31 |
| November | 4 | 2 | 3 | 3 | | | | | | 12 |
| December | 5 | 3 | 6 | 1 | | | | | | 15 |
| 1901. | | | | | | | | | | |
| January | 3 | 4 | 3 | | | | | | | 10 |
| February | 4 | | 2 | | | | | | | 6 |
| March | 7 | 4 | 6 | 1 | | | | | | 18 |
| April | 29 | 6 | 1 | 2 | 1 | 2 | | 1 | 1 | 43 |
| May | 35 | 19 | | 7 | 1 | 1 | 1 | 1 | | 64 |
| June | 25 | 12 | 3 | 5 | 5 | 2 | | | | 52 |
| Total | 146 | 83 | 47 | 23 | 8 | 5 | 1 | 1 | 1 | 315 |

### CHILDREN'S PLAYGROUNDS.

The laws on this subject are as follows:

Act of Congress approved August 30, 1890 (Stat. L., 26, p. 396):

The officer in charge of public buildings and grounds may authorize the temporary use of a portion of the Monument grounds or grounds south of the Executive Mansion or other reservations, in the District of Columbia, for a children's playground under regulations to be prescribed by him.

Act approved March 2, 1895 (Stat. L., 28, p. 943):

The officer in charge of public buildings and grounds shall authorize the use of a portion of the ground within the circle south of the Executive Mansion for a children's playground, under regulations to be prescribed by him.

A playground was set aside between B street north and the main drive north of the Washington Monument. This plat of ground covers an area of about 8 acres and is occupied nearly all the time by men and boys playing football and baseball. This is not in accordance with the law, which specifies "children's playgrounds," but this office has been willing to stretch a point because the ground would not always be occupied by children and also in consideration of the large numbers of clerks and other men who have odd times only for exercise and can afford neither time nor money for distant grounds.

In 1899 Reservation No. 126, in southeast Washington, was leveled off for a playground for "children" in accordance with the law, but adults have gradually encroached upon this also. Owing, in this latter case, to the close proximity of houses around the playground and complaints which have already been received, it will probably be necessary to limit the use of this latter playground to "children" only—not over, say, 15 years of age.

### GROUNDS OF EXECUTIVE MANSION.

The usual work was continued during the year necessary to maintain these grounds in good condition, namely, mowing lawns, edging their margins, sodding bare places on them, cleaning gutters and draintraps, dressing gravel walks, sweeping paved roads and walks, trimming trees and shrubs, caring for flower beds, etc. In November, 1900, the summer plants were removed from flower beds, 50 of them planted with 57,000 spring flowering bulbs and 8 with miscellaneous plants, all of the bulbs, with the exception of 2,200, having been grown in the greenhouses connected with the Executive Mansion. In the spring the bulbs were removed and 60 beds planted with summer plants. A new shrub bed was laid out and planted with low shrubs and evergreens, and a bed was planted with Japanese Lily bulbs presented by Dr. John D. Jones, of Washington, D. C.

The joints of the stone coping of high iron fence on north front were cleaned out and repointed. The steps of the watchman's lodge, the gate pillars at Pennsylvania Avenue entrance to grounds, and 9 lamps and lamp-posts were painted. The iron-railing fence at the northwest corner of the grounds, which had been damaged by the burning of the large stand erected at that point for the reviewing of the inaugural parade, was also repainted, and some plants and shrubs in that corner, which were damaged by the same fire, were replaced with new stock and the ground resodded. The large fountain basins were cleaned and repaired, some decaying trees removed, and several new trees planted. Gas lamps were repaired.

By act approved January 22, 1901, Congress gave the citizens' inaugural committee (Mr. J. J. Edson, chairman) permission to erect stands for spectators and make other arrangements for the festivities connected with the inauguration of President McKinley March 4, 1901. The committee attempted to surpass the efforts of past years and adopted plans for a so-called court of honor on Pennsylvania avenue, in front of the Executive Mansion. The plans involved large stands in the northeast and northwest corners of the grounds of the Executive Mansion. It was with hesitation that this office permitted the erection of the said stands. But the committee were so positive in their promises to permit no damages and to repair such slight damage as it could be seen was unavoidable, that this office finally consented. The committee were very slow in removing their stands after the inauguration, and on the night of March 15 a fire occurred at the stand on the northwest corner of the Executive Mansion grounds, due to the carelessness of the watchman in lighting his lanterns for the night. The fire was soon extinguished, but three of the handsome and expensive granite posts and about fifty feet of granite fence coping were ruined at the gateway of Executive avenue, between the Executive Mansion and the State, War, and Navy Department building. The iron fencing in that locality was also severely burned and a handsome elm in the grounds of the Mansion was ruined.

After the expenses of the inauguration were settled by the committee there was said to be an unexpended surplus of some $2,000 to $2,500. Urgent representations were made to this citizens' committee to repair the damage above referred to, as well as that to two large park flower vases in a public park on Pennsylvania avenue. The committee, however, showed no disposition to pay this just obligation. Even a strong representation of the case from the honorable Secretary of War produced no results and the said surplus was, it is understood, turned over to some charity fund of the District. It is respectfully recommended that in the future—

1. Permission be refused by Congress to future citizens' inaugural committees to erect any stands or other structures whatever on the grounds of the Executive Mansion.

2. That said inaugural committees be required by law to give personal bonds, with guaranty deposits, to each Department of the Government with which they may have to do for the complete repair of all damages to Government property caused, directly or indirectly, by their preparation for inaugural festivities.

The question is submitted as to whether the charity fund above referred to is not subject to legal process for the recovery of damages to United States property above described.

Failing this method, an estimate for $2,500 or so much thereof as may be necessary is submitted for the repair of the damages described.

In accordance with the usual custom the grounds were thrown open to the children on Easter Monday, April 8, 1901. Young trees and shrubs, the fountain basins, and flower beds were protected by temporary wire fencing. Some damage was done to the lawns and the grounds were badly littered. The cost of the labor expended in erecting the temporary fencing, cleaning up grounds, and sodding and seeding worn down places on lawns was $82, and the cost of sod and seed and wire for fencing was $18.11, a total of $100.11.

These grounds are insufficiently drained, and much damage is done to the gravel walks and brick gutters by washouts during each heavy rain storm. Additional drainage facilities should be provided, and an estimate for the work, amounting to $2,000, is submitted and earnestly recommended.

### NORTHWEST DIVISION.

In addition to the work required for the care and maintenance of the improved parks and park places in this division, the following has been accomplished:

*Dupont Circle.*—A new water supply pipe was run for the service of the east drinking fountain and a new stop valve placed on west drinking fountain. The roof of watchman's lodge has been repaired and painted.

*Franklin Park.*—Portions of the gravel walks were resurfaced and repairs made to the plumbing fixtures in the watchman's lodge; 144 linear feet of the asphalt walks were made 2 feet wider by laying a strip of asphalt 1 foot wide on each side of the old walk, the total area covered amounting to 32 square yards; 20 square yards of the asphalt walks were also repaired and resurfaced. The District government laid a cement pavement in place of brick on the west, or Fourteenth street, side of the park.

*Farragut Park.*—Fifty-five feet of additional asphalt walk, about 7 feet wide, was laid, the area covered amounting to 47 square yards; 28 square yards of old asphalt walk were resurfaced.

*Iowa Circle.*—Four square yards of old asphalt walk were resurfaced. Thirteen shrubs and four trees on the lawn surfaces on the south and west sides of the statue of General Logan were removed.

*Judiciary Park.*—The blue-stone apron of gravel roadway east of watchman's lodge was made 8 feet wider and repairs made to some of the cobblestone gutters, 360 square yards of additional asphalt walk were constructed, and 282 square yards of old asphalt walks resurfaced. Repairs were made to plumbing fixtures in the watchman's lodge. Two drain traps were constructed at the entrance at Fifth and G streets NW., and connected with sewer manhole to carry off water during heavy rains and prevent it from running over the sidewalk. Boulevard gas lamps were placed on four lamp-posts, which had been out of service for some months, and lighting recommenced January 1, 1901, to give increased illumination to a part of the park not sufficiently lighted.

*Lafayette Park.*—Considerable grading was done just inside the park lines because of the raising of the granite coping on the north side and its lowering on the east, west, and south sides in consequence of a change in grade made by the District government when laying a new cement pavement in place of a brick pavement on the sidewalk around the park during previous year Three hundred and seventy-six feet of drain pipe were laid for draining the drinking fountain and catch basins in the west end of park, repairs made to supply pipe of west fountain, and a new water supply pipe, 51 feet in length, run for service of east fountain. Repairs were made to the watchman's lodge, a portion of the drain pipe from it relaid, the down spouts connected with sewer, and the interior and exterior of the building painted. New brass labels designating the botanic and English names were placed on some of the trees.

*McPherson Park.*—Sixty-two feet of 6-inch cast-iron drain pipe were laid to drain the drinking fountain; 16 square yards of old asphalt walks were resurfaced.

*Mount Vernon Park.*—No work was done in this park during the year, as almost its entire area is occupied by the new public library building therein.

In September, 1900, the contractor for the erection of the building placed a close board fence, 8 feet high, around the space occupied by him in his operations, the margin left uninclosed being so small as to make it impracticable to bestow any care upon it.

*President's Park (south of Treasury Department, Executive Mansion grounds, and State, War, and Navy Departments).*—Repairs have been made to the gravel roads and walks, 151 cart loads of fresh gravel being used for the purpose. A new tin roof was placed upon the watchman's lodge in southeast corner and the interior woodwork painted. A settlement in the ground under a portion of the granolithic pavement of the sidewalk, south of the iron fence inclosing the Executive Mansion grounds, caused the pavement to break. The broken portion was taken up, necessary filling done, and a temporary board pavement laid until such time as it is deemed advisable to relay with granolithic. At the request of this office, the District government laid an asphalt pavement on B street north at the southeast entrance to the park at Fifteenth street, and in connection with that work regraded 416 square feet of gravel park roadway at the entrance. They also laid an asphalt pavement on B street at the Sixteenth street entrance to the park and regraded 4,800 square feet of gravel park roadway at that entrance. The water pipe in the northwest corner of the park was extended by laying 100 feet of 2-inch galvanized-iron pipe.

*Sheridan Circle, Massachusetts avenue, Twenty-third and R streets, NW.*—The District government has laid a new cement pavement on the sidewalk around this reservation.

*Reservation No. 277 A, Truxtun Circle, Florida avenue, North Capitol and Q streets.*—This unimproved reservation has been highly improved during the year. The ground was graded and sodded, an iron fountain (removed from Reservation No. 22) erected in the center, and necessary water-pipe and drain-pipe connections for same made, and asphalt foot walks constructed, the area paved amounting to 298 square yards.

*Reservation No. 22, Pennsylvania avenue, Twenty-eighth and M streets, NW.*—The large iron fountain in this reservation was taken down and reerected in Truxtun Circle, and a smaller fountain with brick and cement basin and brick and cement concrete coping constructed in its place.

*Reservation No. 32, Pennsylvania avenue, Fourteenth and E streets, NW.*—Six evergreens and 33 flowering shrubs have been planted to replace dead ones.

*Reservation No. 57, Massachusetts avenue, Twenty-second and Q streets, NW.*—Partially improved. Six oak trees were removed, soil spread over the surface of the ground to raise it to proper grade, and 100 Yucca plants planted.

*Reservation No. 62, Massachusetts avenue and N street, between Sixteenth and Seventeenth streets, NW.*—This highly improved reservation, in which the statue of Daniel Webster is located, was still further improved during the year. Four gravel walks were made to connect with a circular walk around the base of the pedestal; the mound was sodded, a border of sod laid along each side of the new walks, the grade of the ground was raised with the soil excavated from the walks, and grass seed sown.

*Reservation No. 64, Massachusetts avenue and N street, between Fifteenth and Sixteenth streets, NW.*—This highly improved reservation, which contains the monument to Samuel Hahnemann, has also been further improved. Three gravel walks were constructed to connect with one around the monument. A border of sod was laid on each side of the walks, the grade of the lawn surfaces raised with soil, and grass seed sown.

*Reservation No. 69, Massachusetts avenue and L street, between Tenth and Eleventh streets, NW.*—A new connection to the street water main was made with the service pipe of the drinking fountain.

*Reservation No. 70, Massachusetts avenue, Ninth and K streets, NW.*—This highly improved reservation was inclosed with an iron post and chain fence, taking the place of an iron-railing fence, which had been erected many years ago by the owner of the adjoining property.

*Reservation No. 77, Massachusetts and New Jersey avenues, First and G streets, NW.*—Two sections of the large iron fountain in this circle, which had been broken by a runaway team, were replaced by new sections and a third section repaired.

*Reservation No. 78, Massachusetts avenue and F street, between North Capitol and First streets, NW.*—Water pipe was laid for introducing water into the reservation.

*Reservations Nos. 98 and 134, Virginia and New Hampshire avenues, Twenty-fifth and G streets, NW.*—These reservations were improved during the summer of 1899 and inclosed with an iron post and chain fence, forming them into one reservation by the incorporation of that portion of Twenty-fifth street which formerly divided them. The act of Congress approved June 4, 1900, granted the Capital Traction Company authority to lay a single track on Twenty-fifth street from G street to Pennsylvania avenue, passing between the reservations, which was done in January, 1901. In May, 1901, the District government constructed a cement pavement on the sidewalk around a portion of the reservations.

*Reservations Nos. 99 and 102, Virginia avenue, between Twenty-second and Twenty-fourth streets, at E and G streets, NW.*—The District government has laid cement pavements on sidewalks of these reservations.

*Reservation No. 163, Vermont avenue, Thirteenth and O streets, NW.*—The post and chain fence inclosing this reservation was taken down temporarily to permit the District government to construct a cement pavement on the sidewalk around the reservation. After the pavement was laid it was decided not to reerect the fence, and the posts and chain were therefore hauled to the property yard at the nursery.

*Reservation No. 174, New York avenue, Tenth and I streets NW.*—Eight square yards of the asphalt walks were repaired

*Reservation No. 188, Indiana avenue, Third and D streets NW.*—A mound of earth was constructed around the base of the pedestal of the statue of Gen. Albert Pike in this reservation, gravel walks constructed around the mound and leading to it from surrounding sidewalks, the soil removed in making the walks used in regrading the surface of the reservation, a border of sod laid around the boundary and on the margins of the new walks, and the water pipe in the reservation extended 17 feet to move the valve from one of the walks.

*Reservation No. 195, New Jersey avenue and First street, between Massachusetts avenue and H street NW.*—The watchman's lodge was painted and gas pipe run into it from street main to supply a gas stove for heating the lodge.

### SOUTHWEST DIVISION.

The usual annual work required for maintaining the improved reservations in good condition was performed.

The following special work was also accomplished:

*Henry Park.*—Repairs were made to one of the gravel roadways; 591 square yards of additional asphalt foot walks were constructed, and 26 square yards of old asphalt walks repaired; the posts of five gas lamps which had not been lighted for some time were taken down and removed from the park.

*Monument grounds.*—The roadway entrance from B street, west of Fifteenth street, was closed up and a new entrance constructed farther east and directly opposite Fifteenth street. The gravel was removed from old entrance, the space filled in with earth, surfaced with soil, seeded, and margins sodded. The iron fence and coping stone and the stone sidewalk and curbing removed from the new entrance were placed at the old entrance. The new entrance is 30 feet wide, and the length of new road graded and dressed was 355 feet. Three brick piers, each 10 feet in height and 4 feet 6 inches square at the offsets, and plastered with cement, were constructed at this entrance to match the old stone pier already standing there.

The laying of an asphalt pavement across B street north at the Sixteenth street entrance to the grounds by the District government necessitated the raising of the grade of the park gravel roadway at that entrance and the relaying of the cobblestone gutters, the work being done by the District authorities.

*Seaton Park.*—The brick pavement at entrance to road from Sixth street, which was badly broken, was taken up and replaced with a pavement of asphalt block, about 76 square yards being laid and 36 linear feet of flagstone gutter laid on curb line. A new shingle roof and new gutters and spouting were placed on the watchman's lodge in southwest part of grounds. A frame lodge, formerly located at the weighing scales of the Treasury Department at the northeast corner of the President's park, was removed therefrom and placed in the east end of Seaton Park, near Missouri avenue, and repaired and painted and gas introduced. Necessary gas pipe was run and six additional lamp-posts and gas lamps were erected in this park in February and lighted nightly. Slight repairs were made to gravel walks. One drinking fountain and 22 lamp-posts and lamps were painted, a new pavement was laid by the District government on the sidewalk on Third street side of park and part of a paved foot walk in the park at that side taken up by them and relaid to new grade.

*Smithsonian grounds.*—Repairs were made to gravel roads, 90 cart loads of gravel having been used for the purpose; a new gravel walk has been constructed to take the place of an old walk south of the stable of the Smithsonian Institution, the work being done by the officials of the Institution and without expense to this office. The exterior of the lodge house at Tenth and B streets, 61 lamp-posts and 51 lamps have been painted, and 240 square yards of asphalt roadway repaired and resurfaced.

*Reservation No. 293, Canal, First, and N streets S W.*—This reservation had long been occupied in violation of law by a party who built a frame house thereon in 1888. The case was placed in the hands of the United States district attorney for the District of Columbia in 1892. On March 19, 1897, the supreme court of the District of Columbia rendered an opinion that the said party was a trespasser and unlawfully occupying the reservation, and ordered and decreed that he remove all buildings, fences, and other obstructions from the grounds within thirty days and deliver the said premises to the possession of the superintendent of public buildings and grounds. From this decree the trespasser appealed, but his appeal was dismissed on October 5, 1897, and he was ordered to perform the decree of March 19, 1897, on or before the 1st day of December, 1897. This was not done, and on the 13th of September, 1898, the United States marshal entered upon the premises, dispossessed the occupant, and turned the property and the keys of the building over to this office.

Nothing further was done in the matter until, by letter of April 21, 1900, the District Commissioners informed this office that the building had, in their opinion, become a public nuisance, and requested me to assist them by abating it. The question was whether I could do this without becoming personally liable for damages. The facts were reported to the Department under date of May 17, 1900, and by indorsement of June 8, 1900, I was given authority to remove the building, but as funds for the purpose would not be available until July 1, 1900, work was necessarily delayed. On July 9 the work of demolition began and was completed on the 11th. Such of the old material as was worth saving was hauled to the property yard at the nursery, the worthless remainder being given to and carried off by persons living in the vicinity.

This reservation has since been unlawfully occupied by parties in the sand business, said to be of this city.

### EAST DIVISION.

In addition to the general work required for the care of the improved parks and park places in this division, the following special work was accomplished:

*Folger Park.*—An asphalt pavement 441 feet long and 5 feet wide, covering an area of 248 square yards, was laid on the walk running from the northwest to the southeast entrance, and the gravel removed during the construction of this pavement, and 50 cart loads of gravel procured from reservation No. 209 were used in repairing low and worn places in the gravel walks.

*Garfield Park.*—Repairs were made to gravel roads, 369 cart loads being used for the purpose, and 10 loads were used in repairing a washout in one of the gravel walks. In the eastern part of the grounds a 4-inch pipe, used to drain water from roadway during heavy storms, was replaced by a pipe of larger (6-inch) capacity, and the sand catch connected with same rebuilt; 303 linear feet of cobblestone gutter 2 feet wide which had settled in places along the line of the large public sewer through these grounds were taken up and relaid; portions of other gutters which had also settled were relaid, and 56 linear feet of new gutter 2 feet wide constructed in the eastern section of the park. In May, 1901, employees of the District government repaired the roadway and gutters at entrance at Virginia avenue and Second street SE., over the large public sewer, and resodded worn portions of the parking at same place.

*Marion Park.*—The gravel walks were repaired, 32 cart loads being used for the purpose.

*Lincoln Park.*—The woodwork and plumbing of the watchman's lodge were repaired and the exterior of the building painted. An asphalt pavement about 4 feet wide was laid along the whole length (1,140 feet) of the eastern walk and nearly all of the asphalt pavement at entrances to walks was widened to cover the entire width of the walks. The total area of asphalt pavement laid in this park during the year amounted to 487 square yards. The gravel excavated in the construction of this pavement was used in repairing walks in the park. Seven gas lanterns were removed from lamp-posts in the line of post and chain fence, their light being no longer required, owing to the erection of electric lamps in the vicinity by the District government.

*Stanton Park.*—An asphalt pavement 306 feet long and 5 feet wide, covering an area of 188 square yards, was laid on the eastern walk, the gravel excavated in the work being used in repairing the gravel walks.

*Reservation 19, between K, L, and Fifth and Seventh streets SE.*—This rectangle, which contains a little over 3 acres, was graded and surfaced with soil during the fiscal year 1900. No work has been done during the present year, but 51 cart loads of fine gravel has been hauled in, without expense to the United States, from building excavations in progress in the vicinity, and piled with other similar material on the reservation for future use in the construction of walks.

*Reservation 79, Massachusetts avenue and F street, between First and North Capitol streets NE.*—Water pipe was laid for irrigating purposes in this unimproved reservation, the surface of the ground plowed and partly spaded, and some clay, received without expense to the United States, spread.

*Reservation No. 122, Virginia avenue and I street, between Fourth and Fifth streets SE.*—This reservation was partially improved in 1900. During the present year a wire fence has been erected extending two-thirds of the way around it.

*Reservation No. 123, Virginia avenue and I street, between Sixth and Seventh streets SE.*—This reservation was partially improved in 1900, and during the present year 4 trees and 91 shrubs have been planted. Part of the flagged walk at base of reservation was taken up and relaid.

*Reservation No. 126, Virginia and Georgia avenues, and L street, between Ninth and Eleventh streets SE.*—This reservation was improved in 1900 for use as a playground. During the present year ruts in the surface of the ground, caused by heavy rains, were filled with clay, and the goal posts for football removed temporarily to the storehouse at nursery to give an increased area for baseball.

*Reservation No. 203, Maryland avenue, First and A streets NE.*—The gravel walks were repaired, 6 cart loads of gravel being used.

*Reservation No. 209, Maryland avenue, Tenth and E streets NE.*—This unimproved reservation was improved during the year. It was a high bank of clay and gravel much above the grade of the surrounding streets. This bank has been cut down, 216 loads of clay and 245 loads of gravel having been removed and the gravel used in repairing roads and walks in other parks. The surface of the reservation was covered with soil, the borders sodded, and the remainder sown with grass seed. The bluff adjoining the reservation was terraced and sodded, and an additional granite marking stone put in place. Water pipe was introduced, and 34 shrubs planted.

*Reservation No. 211, Maryland avenue, Thirteenth and F streets NE.* A portion of the flagged foot walk at the base of this reservation was taken up and relaid.

*Reservation No. 300, Georgia avenue, Fifteenth and L streets SE.*—This is an unimproved reservation containing a bank of gravel much above the grade established for the surrounding streets. During the months of May and June 139 loads of gravel were excavated from the bank, loaded on four railroad flat cars, the cars moved down to Fourteenth street and Maryland avenue SW., and the gravel hauled therefrom in carts to the nursery grounds at Fifteenth and B streets SW., and used in constructing the new roadway in front of the new office building in those grounds.

*Data relating to the principal city parks in the United States.*

| | Name of city. | Population. | | Spent on parks 1891-1900, inclusive. | | | Total. |
|---|---|---|---|---|---|---|---|
| | | 1890. | 1900. | Purchase of land. | Improvement. | Maintenance. | |
| 1 | Albany, N. Y | .......... | 94,151 | $1,082,078.60 | $770,285.46 | $512,540.80 | $2,364,904.86 |
| 2 | Boston, Mass | 448,477 | 560,892 | 4,470,188.34 | 5,977,474.87 | 1,231,286.12 | 11,678,949.33 |
| 3 | Buffalo, N. Y | 255,664 | 352,219 | 142,066.00 | 1,247,617.45 | 1,000,431.64 | 2,248,049.09 |
| 4 | Chicago, Ill | 1,099,850 | 1,698,575 | .......... | 2,492,083.22 | 3,339,189.22 | 5,831,222.44 |
| 5 | Cincinnati, Ohio | 296,309 | 325,902 | .......... | .......... | 544,473.30 | 54,473.30 |
| 6 | Detroit, Mich | 205,876 | 285,704 | 220,024.75 | 1,416,538.61 | 865,822.73 | 2,548,386.09 |
| 7 | Kansas City, Mo | 132,716 | 163,752 | 2,378,802.32 | 199,609.24 | 46,084.85 | 245,694.09 |
| 8 | Louisville, Ky | 161,129 | 204,731 | 352,783.95 | 488,902.64 | 434,221.77 | 923,124.41 |
| 9 | Omaha, Nebr | 140,452 | 102,555 | 420,340.90 | 313,445.28 | 122,715.27 | 856,501.45 |
| 10 | Philadelphia, Pa | 1,046,964 | 1,293,697 | .......... | 900,000.00 | 5,000.00 | 5,900.00 |
| 11 | St. Louis, Mo | 451,770 | 575,238 | .......... | 250,140.00 | 992,411.00 | 1,242,551.00 |
| 12 | San Francisco, Cal | 298,997 | 342,782 | .......... | 1,069,267.06 | 1,007,126.22 | 2,076,393.28 |
| 13 | St. Paul, Minn | 133,156 | 163,632 | 250,000.00 | 475,000.00 | 225,000.00 | 675,000.00 |
| 14 | Savannah, Ga | 57,008 | 60,687 | 42,000.00 | 30,000.00 | 62,627.28 | 92,627.28 |
| 15 | Washington, D. C | 230,392 | 278.718 | .......... | 93,800.00 | 633,500.00 | 727,300.00 |

| | Name of city. | Area of parks in acres | | Average annual cost of maintenance. | Average annual cost of maintenance per acre. | Average annual amount for improvement. | Average cost of improvement per acre. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 1 | Albany, N. Y | Washington and Beaver<br>10 small parks<br>5¼ miles driveway<br>Total | 168.00<br>74.00<br>63.00<br>305.00 | $30,295.00 | $99.00 | $6,059.00 | $2,525.00 | |
| 2 | Boston, Mass | 38 parks | 2,378.02 | 123,128.61 | 879.50 | 597,747.48 | 3,938.00 | |
| 3 | Buffalo, N. Y | Delaware Park<br>Humboldt Park<br>Front Park<br>South Park<br>Cazenovia Park<br>Riverside Park<br>Triangles<br>Total | 362.00<br>56.00<br>48.00<br>155.00<br>106.00<br>22.00<br>276.50<br>1,025.50 | 100,000.00 | 97.00 | 124,761.00 | 121.50 | |

*Data relating to the principal city parks in the United States*—Continued.

| | Name of city. | Area of parks in acres. | | Average annual cost of maintenance. | Average annual cost of maintenance per acre. | Average annual amount for improvement. | Average cost of improvement per acre. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 4 | Chicago, Ill | Jackson Park | 523.90 | $333,918.92 | $177.00 | $249,203.32 | $2,200.00 | |
| | | Washington Park | 371.00 | | | | | |
| | | Lake Park | 186.43 | 95,614.45 | | 119,927.00 | | |
| | | Gage Park | 20.00 | | | | | |
| | | Midway Plaisance | 80.00 | | | | | |
| | | Boulevards | 318.48 | | | | | |
| | | Total | 1,499.81 | | | | | |
| 5 | Cincinnati, Ohio | Eden Park | 209.25 | 54,447.83 | 139.50 | | | The amount appropriated each year is barely enough to maintain the parks; hence no improvement. |
| | | Hopkins Park | 1.00 | | | | | |
| | | Burnet Woods | 163.50 | | | | | |
| | | Lincoln Park | 10.00 | | | | | |
| | | Washington Park | 5.60 | | | | | |
| | | Garfield Park | 1.00 | | | | | |
| | | Total | 390.35 | | | | | |
| 6 | Detroit, Mich | Belle Isle | 707.00 | 86,582.27 | 76.00 | 141,653.86 | 124.36 | Boulevards are 11.29 miles long. |
| | | Clark | 24.73 | | | | | |
| | | Palmer | 140.41 | | | | | |
| | | 25 small parks | 54.48 | | | | | |
| | | Boulevards | 212.83 | | | | | |
| | | Total | 1,139.45 | | | | | |
| 7 | Kansas City, Mo | The Paseo Park | 14.9 | 2,320.94 | 155.77 | 21,707.56 | 1,456.88 | Improvements completed. |
| | | Independence Plaza Park | 1.7 | | | 5,358.49 | 3,152.05 | Improvements incomplete. |
| | | North Terrace Park | 200.0 | | | 5,675.81 | | Improvements barely started. |
| | | Holmes Square Park | 2.8 | 1,408.97 | 503.20 | 2,922.21 | 1,043.85 | Improvements completed. |
| | | The Panda Parkway | 6.8 | 1,346.76 | 198.05 | 10,200.08 | 1,500.01 | Do. |
| | | The Grove Park | 12.2 | | | 1,035.86 | | Improvements not fully started. |
| | | The Parade Park | 21.0 | | | 254.96 | | Do. |
| | | Penn Valley | 134.3 | | | | | Improvement not started. |
| | | Observation Park | 2.1 | 577.98 | | 8,623.14 | 4,106.26 | Improvements nearly completed. |
| | | Budd Park | 26.0 | 3,160.91 | 121.57 | 822.40 | 31.63 | Do. |
| | | South Moreland Park | 6.5 | 202.50 | | 305.77 | | Improvements not fully under way. |
| | | Total | 428.3 | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | Louisville, Ky. | [illegible] Park | [illegible] | 43,422.18 | ............ | 48,890.76 | ............ | |
| | | Cherokee Park | 331.14 | | | | | |
| | | Shawnee Park | 167.36 | | | | | |
| | | Interior squares | 6.67 | | | | | |
| | | Total | 1,175.78 | | | | | |
| 9 | Omaha, Nebr. | Hansam Park | 57.69 | 7,143.29 | 123.82 | 9,915.35 | 171.87 | |
| | | Elmwood Park | 208.13 | 575.52 | 2.76 | 4,025.09 | 19.33 | |
| | | Bemis Park | 9.40 | 858.54 | 6.16 | 1,496.84 | 159.27 | |
| | | Fontenelle Park | 107.63 | 6.82 | .06 | 388.14 | 3.61 | |
| | | Miller Park | 78.00 | 813.35 | 10.41 | 1,371.79 | 17.59 | |
| | | River View Park | 110.82 | 1,903.45 | 54.37 | 4,837.52 | 483.75 | |
| | | Kountze Park | 10.73 | ............ | ............ | 7,959.37 | 741.85 | Acquired in 1898. |
| | | Curtiss Turner Park | 7.32 | ............ | ............ | 1,746.64 | 238.61 | Acquired in 1890. |
| | | 2 small parks | 2.82 | 715.50 | 414.24 | 4.11 | 2.40 | |
| | | Total | 592.44 | | | | | |
| 10 | Philadelphia, Pa | Fairmount Park | 3,353.90 | 500,000.00 | ............ | 100,000.00 | 2,000.00 | |
| | | Hunting Park | 43.00 | | | | | |
| | | 60 city squares | 600.00 | | | | | |
| | | Total | 3,996.90 | | | | | |
| 11 | St. Louis, Mo. | Carondelet Park | 180.00 | 99,241.00 | 45.58 | 25,014.00 | 11.48 | |
| | | Forest Park | 1,371.94 | | | | | |
| | | Benton Park | 14.30 | | | | | |
| | | Hyde Park | 11.84 | | | | | |
| | | Lyon Park | 10.92 | | | | | |
| | | O'Fallon Park | 158.32 | | | | | |
| | | St. Louis Place | 13.88 | | | | | |
| | | Compton Hill R. Park | 40.00 | | | | | |
| | | Lafayette Park | 29.95 | | | | | |
| | | Missouri Botanic Garden | 50.00 | | | | | |
| | | Tower Grove Park | 266.67 | | | | | |
| | | 9 small parks | 28.77 | | | | | |
| | | Total | 2,176.59 | | | | | |
| 12 | San Francisco, Cal | Golden Gate Park | 1,014.00 | 111,902.91 | 79.93 | 118,807.45 | 1,600.00 | On account of soil being shifting sands it is necessary to cover with a foot of loam; hence the expense. |
| | | Alamo Park | 12.70 | | | | | |
| | | Lobis Park | 12.69 | | | | | |
| | | Golden Gate Cemetery Park | 145.95 | | | | | |
| | | Alta Plaza Square Park | 11.90 | | | | | |
| | | Jefferson Square | 11.28 | | | | | |
| | | Buena Vista Park | 36.22 | | | | | |
| | | Mountain Lake Park | 19.93 | | | | | |
| | | 26 small parks | 98.65 | | | | | |
| | | Total | 1,363.32 | | | | | |

*Data relating to the principal city parks in the United States*—Continued.

| | Name of city. | Area of parks in acres. | | Average annual cost of maintenance. | Average annual cost of maintenance per acre. | Average annual amount for improvement. | Average cost of improvement per acre. | Remarks. |
|---|---|---|---|---|---|---|---|---|
| 13 | St. Paul, Minn | Como Park | 410.00 | $25,000.00 | $64.33 | $52,000.78 | $1,000.94 | $68,000, cost of Phatan Park, now under acquisition proceedings, with money ready to pay for it. |
| | | Indian Mounds | 17.00 | | | | | |
| | | Merriam Terrace | 10.00 | | | | | |
| | | Langford Park | 10.00 | | | | | |
| | | Scattered parks and squares | 132.00 | | | | | |
| | | Total | 579.00 | | | | | |
| 14 | Savannah, Ga | All parks | 69.43 | 9,262.72 | 134.25 | 2,500.00 | 36.00 | |
| 15 | Washington, D. C | President's Park | 82.22 | 63,350.00 | 156.41 | 9,380.00 | 23.13 | |
| | | Monument Park | 78.58 | | | | | |
| | | Smithsonian Park | 58.02 | | | | | |
| | | Judiciary Park | 19.82 | | | | | |
| | | Franklin Park | 4.65 | | | | | |
| | | Lafayette Park | 6.95 | | | | | |
| | | Lincoln Park | 6.58 | | | | | |
| | | Garfield Park | 23.98 | | | | | |
| | | 295 small scattered parks | 124.26 | | | | | |
| | | Total | 405.06 | | | | | |

### OCCUPANCY OF RESERVATIONS BY COMMITTEE ON INAUGURAL CEREMONIES, MARCH 4, 1901.

Under the authority contained in the act of Congress approved January 22, 1901, the Committee on Inaugural Ceremonies erected during February stands for viewing the inaugural parade. One at the northeast corner of the Executive Mansion grounds and one at the northwest corner; one at the southeast corner of Lafayette Park and one at the southwest corner; and one stand each in front of reservation No. 32, Pennsylvania avenue, Fourteenth and E streets NW.; reservation No. 34, Pennsylvania avenue, Ninth and C streets NW.; and reservation No. 35, Pennsylvania avenue and C street, between Eighth and Ninth streets NW. The committee also erected tents, poles, and framework on a portion of the Washington Monument grounds between Fifteenth and Sixteenth streets, and south of B street, for use in connection with a display of fireworks, and erected frame buildings and wooden-covered passageways at the entrances to the Pension Office building in Judiciary Park in connection with the inaugural ball and concerts held in that building. All of the foregoing structures were removed by the committee by the 20th of March.

The damage done by this use of the reservations was as follows, that in the Executive Mansion grounds being described in another part of this report:

At reservation No. 32, two of the iron plant vases were broken by falling timbers and the trees and shubbery considerably damaged.

At reservation No. 34, the iron-pipe rail fence was bent in four places by falling timbers and one of the pipe rails taken off. This office straightened the bent rails and put in a new rail to replace the one removed.

In Judiciary Park the lawn was much cut up, the border of pansies around the fountain basin considerably damaged and the wire fence around same broken down. Employees of this office removed the accumulated rubbish and a board walk across one of the lawns, and filled up the ruts on lawns. The committee placed new stakes around the border at the fountain.

Only slight damage was done in the Monument grounds, which was repaired and the grounds cleaned at the expense of the committee.

### PROPAGATING GARDENS, INCLUDING THE GREENHOUSES AND NURSERY.

Necessary repairs were made to the various greenhouses during the year, and the large and valuable collection of plants was maintained in good condition.

Repairs were made to decayed woodwork in the houses, such as staging, rafters, sashes, wall plates, posts, etc., and all of the new work painted. New tin gutters were made and put up on the houses and old gutters and down spouts repaired. Broken glass was replaced with new and old glass reputtied where needed. The glass roofs of greenhouses were repainted and some miscellaneous painting and whitewashing done. Necessary attention was paid to the boilers and heating pipes, flues being opened and cleaned, leaks in hot-water pipes repaired, and defective lengths replaced with new ones. A shed 60 feet long 26 feet wide, and 14 feet high was constructed for storing potting soil.

An addition to two of the propagating houses was built. It is 119 feet 7 inches long, 9 feet 7 inches wide, and 8 feet high, and was erected between the two old houses and constructed mainly of old material; 1,104 feet of 4-inch hot-water heating pipe was placed in these houses. The two old houses were formerly heated by four hot-air flues and the change to hot-water heating will dispense with three fires.

The decayed frame work of the superstructure of one of the greenhouses was torn down and rebuilt with new materials. The house is 200 feet long and 12 feet wide and in the work of reconstruction the roof was raised 2½ feet, so that its height is now 10 feet 6 inches.

The photograph building which formerly stood in the northeast corner of the President's Park on the site of the statue of General Sherman, and which was transferred to this office by the Treasury Department, taken down, and hauled to the propagating gardens in 1899, was reerected at the gardens during the year for use as an office building. The building is an ornamental frame structure two stories in height and is a vast improvement over the old frame shed formerly used as an office and storehouse, which has been torn down. The ground in front of the new office has been graded, lawn surfaces constructed, trees and shrubs planted, a gravel roadway constructed, two granite gateposts erected and a double iron gate hung at entrance, a flagstone walk laid, a rockwork fountain with iron basin constructed in front of the building, necessary waterpipe and drainpipe connections made for same, and appropriate plants planted in the rockery. An old two-story frame storehouse which stood in rear of the new office building was moved to another location.

There were propagated during the year in the greenhouses for stock for planting in the parks and for other departments and institutions, as shown by the tabulated statement in another part of this report, 984,216 plants, in 40 different kinds and 125 varieties. There were purchased during the year under contract 94,500 flowering bulbs for winter forcing in the greenhouses and for fall planting and early spring bloom in the parks. Dr. John D. Jones, of Washington, D. C., presented 3,200 Japanese lily bulbs for planting in the public grounds.

The following plants were grown in the greenhouses for fall, winter, and spring bloom:

518 aparagus.
5,516 carnations.
2,325 roses.
1,306 smilax.

There were potted and boxed for winter forcing the following bulbs:

1,000 lilium.
9,600 pips lily of the valley.
5,000 narcissus.
14,745 Roman hyacinths.
6,500 tulips.

There were potted for spring park planting 3,600 *Lilium auratum* bulbs.

In the autumn of 1900 13,419 chrysanthemum plants were sent out to the parks to be planted for early fall bloom, and 20,134 pansy plants and 91,190 spring flowering bulbs for early spring bloom. In May and June 723,241 bedding plants and 6,000 tropical plants were sent out for summer planting in the parks; 21 vases were stocked with plants, 1,000 plants being used for the purpose, and water lilies were planted in the basins of some of the fountains; 53,186 plants were fur-

nished for the grounds of Executive Departments and of public institutions, and the few surplus plants remaining were given away, mainly to hospitals.

In the nursery the lawns were mown, young stock cared for, and the grounds maintained in a cleanly condition. A rick of hay was constructed for use of the public animals. It contains about 10 tons of hay, which was cut in the Smithsonian grounds and Henry Park. A temporary shed 40 feet long and 22 feet wide was constructed over the hay as a protection from the weather, and a post and wire fence erected around the rick as a barricade. A sash roof was constructed over a brick tank 63 feet long by 15 feet wide, for use in storing lily bulbs; 30 feet of additional water pipe were laid alongside one of the shops. The heavy iron fence with granite base which was removed from the east side of the site of the statue of General Sherman, in the President's Park, was set up on the Fifteenth street side of the nursery grounds, between C and D streets, and two heavy granite pillars set up at the main east or C street entrance; 440 feet of lighter iron picket fence, which had been removed from same site, were set up on part of the south and west boundaries of the grounds. Granite gateposts were also set up at the other east entrance, iron posts at the northwest entrance, and a double iron gate set at the latter entrance. A large weighing scales, transferred to this office by the Treasury Department, was removed from the site of the Sherman statue and set up at the C street entrance to the nursery grounds. A piece of the Fifteenth street dirt roadway, commencing at the C street entrance and running north a distance of 250 feet, was shaped up and the sidewalk, roadway, and gutters outlined and a portion of the same roadway for a distance of 60 feet south of C street was cut down about 1 foot and graded but not outlined. The earth excavated in the foregoing work was used in raising the grade of the roadway in the southern part of the nursery grounds on the line of C street.

A large quantity of old condemned property, such as old metal, building material, etc., which was stored in the property yard at the nursery, was sold at public auction in December, 1900, and the proceeds, $727.81, deposited in the Treasury.

There were planted in these grounds:

| | |
|---|---|
| Gladiolus bulbs for summer flowering | 750 |
| Tuberose bulb for summer flowering | 710 |
| Miscellaneous plants for summer and autumn flowering and for stock | 4,900 |
| Pansy plants for replanting park beds in spring | 1,680 |
| Chrysanthemums | 364 |
| Trees for stock | 50 |
| Shrubs for stock | 723 |

There were purchased during the year 714 young trees, 582 young shrubs, 1,458 plants, and 1,750 bulbs. There were sent out for planting in the parks 100 young trees and 1,257 young shrubs.

Extensive improvements have been made at these gardens. Nearly 1,000,000 plants are annually propagated at the greenhouses for use in the summer and autumn decorations of the public parks. The beautiful water lilies and other aquatic plants used in many of the fountain basins are also propagated here.

The work of filling up low portions of the additional and much-needed space which was temporarily added to the nursery from the Potomac Flats by transfer made in May, 1899, by Col. Charles J. Allen, Corps of Engineers, by authority of the Chief of Engineers,

has been continued, about 10,980 loads of good earth filling
been deposited and graded during the year without expens
United States.

This office is frequently in receipt of requests for the loan
from the gardens for the use of churches, fairs, festivals,
demands are constantly made for flowering and decorative pl
private purposes.

All such requests have to be declined, as either the loan or
any plants would be in violation of the following extract fro
of Congress approved June 20, 1878:

> *Provided*, That hereafter only such trees, shrubs, and plants shall be pro
> the greenhouses and nursery as are suitable for planting in the public res
> to which purposes only the said productions of the greenhouses and nurser
> applied.

After the annual spring planting in the parks is completed
times happens that there is a small surplus of bedding plants
These are divided among such public reservations or institution
State, War, and Navy building, Marine Barracks, Washingto
duct grounds, Fort Myer Military Reservation, and various h
and orphan asylums. After these are supplied, should there
few such surplus plants remaining, they are given to whoever
for them.

This office also furnishes, after its park planting is complete
plants and shrubs for beautifying the grounds of the various Ex
Departments.

*New storehouse at the nursery.*—In the sundry civil appropria
approved June 6, 1900, Congress provided an appropriation of
for the construction of an iron and brick storehouse in the
grounds, making the funds immediately available. A project
work was submitted to the Chief of Engineers, United States
June 8, 1900, and approved by the Secretary of War Ju
1900. Work was at once commenced moving some of the old
buildings from the site selected for the new structure; the exca
for its walls begun, and completed July 18. Concrete work wa
menced July 19 and completed July 24, and brickwork comple
September, a total of 140,000 brick having been laid. The roof
was commenced in September, completed in October, and the
building completed in the latter month. It is a one-story bu
with a basement and is 100 feet long, 40 feet wide, and 23 feet
from floor to eaves, with a 12-foot rise to the roof. As soon
building was completed the old wooden "shacks" which had bee
as storehouses were torn down and removed.

*Building for shops at the nursery.*—In the sundry civil act app
March 3, 1901, an appropriation of $8,500 was provided for the
struction of a brick building for shops in the nursery ground
funds being made immediately available. A project for the wor
submitted to the Chief of Engineers, United States Army, March 8,
and approved by him March 11, 1901. Work was at once comm
tearing down an old frame building used as a carpenter shop,
stood on the site selected for the new building. Excavation was
menced on March 21 and completed on April 5. Concrete foo
for brick walls and piers constructed, brickwork commenced Ap
and this and all other work completed in May, except such as ca
be finished until roof trusses are erected.

3

This building, when completed in July or August, will provide shops for carpenters, plumbers and tinners, painters, blacksmiths, etc., and will provide considerable storage room as well as a wash room for employees.

### PLANS FOR IMPROVING SECTION SOUTH OF PENNSYLVANIA AVENUE AND NORTH OF B STREET SW., AND FOR A SUITABLE CONNECTION BETWEEN POTOMAC AND ZOOLOGICAL PARKS.

In the sundry civil appropriation act approved June 6, 1900, it was provided that—

> The Chief of Engineers of the United States Army is authorized to make an examination and to report to Congress on the first Monday in December, nineteen hundred, plans for the treatment of that section of the District of Columbia situated south of Pennsylvania avenue and north of B street southwest, and for a suitable connection between the Potomac and the Zoological parks, and in making such examinations and plans he is authorized to employ a landscape architect of conspicuous ability in his profession,

and $4,000 was appropriated for services and expenses incident to such examination and report.

The duty of carrying out this provision of law was assigned to this office by the Chief of Engineers by letter of June 21, 1900. By the 20th of July a preliminary agreement had been reached with Mr. Samuel Parsons, jr., senior partner of the firm of Parsons & Pentecost, of New York City, and by August 22 the work had, with the approval of the Chief of Engineers, been definitely assigned to Mr. Parsons. On November 14, 1900, he submitted his report, with accompanying map, which, together with an approximate estimate of cost, were transmitted by this office to the Chief of Engineers, with letter of November 15, 1900, and will be found printed in Document No. 135, House of Representatives, Fifty-sixth Congress, second session.

This report is of extreme artistic value to Washington and by one of the very first landscape architects of this country. The report itself is a model, and Mr. Parsons's proposed improvements are not only worthy of the subject, but will, it is believed, carry conviction to the minds of the entire country.

### STATUES.

There are 21 statues in the national public grounds under charge of this office, as follows:

Daguerre.
General Hancock (equestrian).
General Scott (equestrian).
Admiral Du Pont (standing).
Professor Henry (standing).
General Thomas (equestrian).
Admiral Farragut (standing).
President Jackson (equestrian).
President Washington (equestrian).
General Logan (equestrian).
President Garfield (standing).
General Lafayette (standing).
Mr. Webster (standing).
General Greene (equestrian).
Dr. Gross (standing).
President Lincoln (2) (standing).
General McPherson (equestrian).
Dr. Hahnemann (sitting).
General Rawlings (standing).
Albert Pike (standing).

Those of General Logan and Albert Pike were completed during the year.

During the year the stains on the bronze work of some of the statues in the parks and the worst stains on their stone pedestals were cleaned off and broken joints in the stonework of the pedestals repaired with cement where required.

### SHERMAN STATUE.

The sculptor and contractor for the Sherman statue, Mr. Carl Röhl-Smith, died August 20, 1900, while on a visit to his home in Denmark. By resolution of the statue commission December 3, 1900, the widow was authorized to complete her husband's work, using therefor such expert assistance as might be found necessary. A new contract for this purpose was executed with Mrs. Röhl-Smith on April 8, 1901, and the work is making good progress. The pedestal is complete; four figures for the pedestal are being cast at the foundry; work is progressing on the plaster cast of the equestrian statue and of the bas-reliefs and inscriptions; the designs have been made, some approved, and some are still under consideration and improvement.

In the deficiency appropriation act approved June 6, 1900, the sum of $8,000 was provided for "removal of present iron fence around the site of the Sherman statue and setting up of a substantial granite curb in place thereof." Work was commenced in September and completed in November, taking down the old iron fence and stone coping, which were removed to the propagating gardens in the Monument grounds, where they were reerected, as mentioned elsewhere in this report. Fifteen hundred linear feet of new granite coping and 12 granite corner posts were purchased, of which 713 feet of coping and 9 posts have been set in position. Part of the low ground on the west side of the site, which is below the established grade, was partially filled with 559 cart loads of clay, which were deposited and spread without expense to the United States.

### STATUE OF DANIEL WEBSTER.

The sculptor had the lettering on pedestal regilded in July, 1900.

### HAHNEMANN MONUMENT.

In July, 1900, the contractors completed the lettering on stonework, and placed two ornamental carved caps at corners of the statue. In August the lettering and mosaic work were finished, which completed the statue.

### STATUE OF GEN. ALBERT PIKE.

The work of setting the pedestal was commenced on July 2 and completed on the 13th, the corner stone having been set on July 4; the bronze figure of General Pike was placed on July 14, and a female bronze figure was placed on the east side of pedestal on July 16.

### STATUE OF GENERAL LOGAN.

The equestrian statue of General Logan (in Iowa Circle) was set in position January 23, 1901. The unveiling ceremonies took place April 9, 1901, the arrangements therefor being under the direction of this office.

### STATUE OF GENERAL GRANT.

By act approved February 23, 1901, Congress appropriated $10,000 for designs for a statue or memorial to Gen. U. S. Grant. Under date of April 10, 1901, the commission in charge issued an invitation to sculptors to submit competitive designs and published the terms governing the competition.

### STATUE OF GENERAL M'CLELLAN.

By sundry civil act approved March 3, 1901, Congress appropriated $50,000 for the preparation of a site and the erection of a pedestal for, and the completion of, a statue of the late Maj. Gen. George B. McClellan.

Under date of May 3, 1901, the commission in charge issued an invitation to sculptors to submit competitive designs and published the terms governing the competition.

Copies of the abovesaid two invitations are appended to this report as Appendixes C and D.

## MISCELLANEOUS.

### SETTEES, TOOLS, MANURE, CONSTRUCTION AND REPAIR OF POST-AND-CHAIN FENCES, AND REMOVING SNOW AND ICE.

During the year park settees were repaired and 128 painted. All settees in the parks were examined and those found loose were refastened to the ground with stakes and wire.

Repairs were made to lawn mowers, wheelbarrows, and miscellaneous tools, edged tools sharpened and kept in good order, and new tools purchased from time to time as required.

About 230 cubic yards of stable manure, 90 cubic yards of cow manure, and 200 cubic yards of potting sod were purchased, the greater part of the stable manure mixed with soil and made into compost and spread over park lawns and around young trees and shrubbery, and part of the stable manure used in enriching flower beds, about 625 cart loads having been used in the parks for these purposes during the year. The cow manure and the potting sod were made into potting compost for plants at the greenhouses and nursery.

Repairs were made to iron fences, new caps placed on the iron posts of post-and-chain fences to replace broken and missing caps, posts out of line straightened, and repairs made to the iron chains where required. One reservation was inclosed with iron post-and-chain fence during the year, and the fence inclosing another was removed.

The snow and ice were removed as soon as possible after storms from the walks through and sidewalks around the various parks and park places. The snowfall of last winter was light and the sum allotted for removing it was sufficient for the purpose.

### PAINTING WATCHMEN'S LODGES, IRON FENCES, VASES, LAMPS, AND LAMP-POSTS.

Four of the watchmen's lodges, parts of 6 others, the iron post and chain fences and the iron post and bar fences inclosing 7 of the small reservations, part of the iron post and chain fence of the Smithsonian grounds, being a total of 414 posts, 294 lengths of chain and 95 bars, the light iron railing fence inclosing reservation 179 and the iron picket fence on northwest side of the Executive Mansion grounds, 98 lamp-posts and 88 gas lamps have been painted.

### WATER PIPES AND FOUNTAINS.

Repairs have been made to water pipes and valves from time to time where necessary, new valves put on, and new iron extension boxes placed over valves to replace old boxes. In the autumn the water was shut off from the various parks, the hose valves removed, stored in the shops at the nursery, and repaired and repacked during the winter. In the spring the valves were replaced in the parks. During the year water pipe was introduced into 20 reservations hitherto unprovided with irrigating facilities, and additional water pipe was laid in the President's Park and the nursery grounds. The total quantity of water pipe laid during the year for irrigating purposes was 780 feet of 1-inch pipe, 161 feet of 1¼-inch pipe, 100 feet of 2-inch pipe, with the necessary valves.

There are 22 small fountains with basins in charge of this office. Repairs were made to the cement basins of these fountains wherever needed; and they were cleaned out, stone copings repointed, stains removed from them, and the supply and waste pipes and valves maintained in order. The jets, which, with a few exceptions are of very simple character, were removed from the fountains in the autumn, the water turned off, jets requiring it repaired, and all replaced in the spring. One fountain was constructed during the year in reservation No. 22, at Pennsylvania avenue, Twenty-eighth and M streets NW. This fountain is a small one with cement basin and brick and cement concrete coping, and was erected to replace the large iron fountain formely standing there and now removed to reservation at Florida avenue, North Capitol and Q streets. That fountain and the large iron fountain at Pennsylvania avenue, Ninth and C streets NW., were repainted.

There are 24 drinking fountains in the various parks, and they have been maintained in good order and repairs made when necessary. At the approach of winter the water was shut off and the dippers removed. In the spring the dippers were replaced and the water turned on.

### LIGHTING THE PUBLIC GROUNDS.

The following parks are lighted with arc electric lights:

| | Lights. | | Lights. |
|---|---|---|---|
| Executive Mansion grounds | 8 | Judiciary Park | 9 |
| President's Park | 9 | Lincoln Park | 8 |
| Monument Park | 12 | | |
| Lafayette Park | 6 | Total | 61 |
| Franklin Park | 9 | | |

The number of gas lamps not connected with meters lighted nightly during the year was 238 from July to December, 231 from January 1 to January 9, 236 from January 10 to January 14, 228 from January 15 to February 5, and 234 from February 6 to June 30. Five lamp-posts in Henry Park which were not in service were taken down during the year and 6 additional lamp-posts and lamps were erected in Seaton Park.

In addition to the gas lamps mentioned in the foregoing paragraph there are 71 burners in the Executive Mansion grounds connected with the meters in the Mansion.

All of the gas lamps in the public grounds have been maintained in good condition, minor repairs made, and old lanterns replaced with new boulevard lamps as the old ones became unserviceable.

It is earnestly hoped that the system of lighting the public grounds by electricity will be extended to the Smithsonian grounds and to the various improved parks throughout the city.

### CONSTRUCTION AND REPAIR OF ASPHALT PAVEMENTS.

The following tabulated statement shows the area of asphalt roadway and foot-walk pavements constructed and repaired during the year:

| Locality. | New walks. | | | Repairs to roadways. | Repairs to walks. |
|---|---|---|---|---|---|
| | Length. | Breadth. | Area. | | |
| | *Feet.* | *Feet.* | *Sq. yds.* | *Sq. yds.* | *Sq. yds.* |
| Lafayette Park | 318 | 5 | 179 | .......... | 71 |
| Farragut Park | 55 | 7.1 | 47 | .......... | 28 |
| McPherson Park | .......... | .......... | .......... | .......... | 16 |
| Franklin Park | 144 | 2 | 32 | .......... | 20 |
| Iowa Circle | .......... | .......... | .......... | .......... | 4 |
| Reservation No. 174, New York Avenue and I street, between Tenth and Eleventh streets NW | .......... | .......... | .......... | .......... | 8 |
| Judiciary Park | 560 | 5 | 340 | .......... | 282 |
| Truxtun Circle | 260<br>123 | 5.9<br>8.3 | 298 | .......... | .......... |
| Smithsonian Grounds | .......... | .......... | .......... | 240 | .......... |
| Henry Park | 1,054 | 5 | 591 | .......... | 26 |
| Folger Park | 441 | 5 | 248 | .......... | .......... |
| Stanton Park | 306 | 5 | 188 | .......... | .......... |
| Lincoln Park | 1,140 | 3.8 | 487 | .......... | .......... |
| Total | 4,401 | .......... | 2,410 | 240 | 455 |

### DEPARTMENTAL TELEGRAPH LINE.

The telegraph lines now under control of this office are as follows:

The line of overhead wires consists of 82 poles, covering a distance of about 3½ miles, with a length of about 16 miles of wire. This line starting from the State, War, and Navy Department building runs to the Executive Mansion, thence to the Treasury Department, thence to G street, thence to Eighth street, thence to H street, thence to North Capitol street, and thence to the Capitol. Connected with it is one running from the Treasury Department along Fourteenth street to the Bureau of Engraving and Printing and Agricultural Department, one down Fifth street to the Pension building, and one from the Treasury Department building up Fifteenth street to I street to Fifteen-and-a half street to K street, near Vermont avenue, connecting with the building temporarily occupied by the offices of the Department of Justice. There are about 500 feet of 13-conductor Patterson cable running from the cable pole in the Capitol grounds into the basement of the Senate, and 250 feet of 20-conductor cable running from the cable pole on the corner of Seventeenth and G streets into the State, War, and Navy building.

During the year the main and local batteries received necessary attention, and were maintained in good working order. All crosses and other obstructions on the wires of the line were removed as soon as possible, instruments maintained in good condition, necessary repairs made to line wires, the wires pulled up taut and slack cut out, fixtures on roofs of Department buildings repaired and rebraced and an old fixture on the roof of the Treasury Department building replaced by a new one. Guy wires were placed on the poles of the line where needed. New wires were run in the State Department building and Interior Department building to replace old and defective wires. Some necessary changes were made in the lines between Fourteenth and B streets NW. and the new Post-Office Department building.

Owing to the widening of the roadway of G street between Ninth and Tenth streets and Fourteenth and Fifteenth streets NW., it became necessary to move five of the line poles on the south side of that street back about 6 feet, to the new curb line, 3 between Ninth and Tenth streets, and two between Fourteenth and Fifteenth streets.

In May, 1901, a new electric storage battery was purchased for furnishing current to the wires of the line in place of the old-style gravity main battery, heretofore in use. The new battery was tested and found satisfactory, and a duplicate battery purchased in June in order that there may be one ready for use while the other is being charged. The current for these batteries will be obtained from the dynamos in the State, War, and Navy Departments building.

The necessity for replacing the poles and overhead wires with a system of underground cables has been urged in previous annual reports, and is so apparent that argument in its favor is unnecessary. Estimates have been prepared and submitted in previous years. The cost of the underground system will be about $30,000, and the matter is presented for such action as Congress may deem best.

### OLD RECORDS OF THE CITY OF WASHINGTON.

On January 27, 1898, the United States Senate passed a resolution directing the Secretary of War to transmit to the Senate at as early a date as possible the numbers and locations of all lots in the District of Columbia the title to which the records in the office of the Commissioner of Public Buildings and Grounds show to be in the United States; also report of all lots in the District of Columbia sold or donated by the United States, the numbers of the squares in which such lots are located, the date of sale, the names of purchasers, and the amounts received.

A copy of the resolution was referred to this office on January 28 from the office of the Chief of Engineers, with request for early report, and on May 21, 1898, there was sent to the Chief of Engineers, in partial compliance with the requirements of the resolution, the following:

(1) List of lots in the city of Washington, D. C., the title to which the records of this office show to be in the United States, there being no record of the sale of said lots; and

(2) List of lots in the city of Washington, D. C., which are shown by the records of this office to have been donated by the United States.

On December 22, 1898, there was sent to the Chief of Engineers in further compliance with the resolution a partial "list of all lots in the District of Columbia sold by the United States, compiled from old records in the Office of Public Buildings and Grounds," covering squares numbered from 1 to 245, consecutively; on December 7, 1899, an additional list of lots sold was sent to the Chief of Engineers covering the squares numbered from 247 to 760, both inclusive, and on November 22, 1900, an additional and final list of lots sold was sent to the Chief of Engineers, United States Army, covering the squares numbered from 761 to 1149, both inclusive.

Since the "list of lots in the city of Washington, D. C., the title to which the records of this office show to be in the United States, etc.," was sent to the Chief of Engineers, United States Army (on May 21, 1898), there have been discovered some detached unbound lists and other papers containing a record of various sales of many lots, which sales were not posted in either the old journals or ledgers. Accordingly a new list was prepared and forwarded to the Chief of Engineers

November 23, 1900, with recommendation that it supersede and take the place of the list sent in May, 1898, which list was printed in Senate Ex. Doc. No. 277, Fifty-fifth Congress, second session. The corrected list is printed in Senate Docs. 31 and 106, Fifty-sixth Congress, second session.

The act of Congress approved March 3, 1899, provided:

> SEC. 2. That the Secretary of War be, and he is hereby, authorized and directed to correct the records of the War Department in respect of any of the lots mentioned in Senate Document Numbered Two hundred and seventy-seven, Fifty-fifth Congress, second session (being a letter from the Secretary of War transmitting, in compliance with the resolution of the Senate of January twenty-seventh, eighteen hundred and ninety-eight, a letter from the Chief of Engineers, together with list of lots in the city of Washington, District of Columbia, the title to which the records of his office show to be in the United States, and list of lots in the city of Washington, District of Columbia, which are shown by the records of his office to have been donated by the United States), upon the filing by an actual occupant of any of the lots mentioned in said document sufficient proof that the said occupant or the party under whom he claims has been in actual possession of the said lot or lots for an uninterrupted period of twenty years, so that said records shall show the title to said lots to be in the said occupant.

Between the date of that act and June 30, 1901, the required proof has been furnished by the occupant, and the records corrected in the cases of twenty of the lots, so far as this office is informed, the title to which was shown to be in the United States. Of those twenty cases eleven were corrected in 1900 and nine in 1901.

In order that the record of the original disposition of the lots in the Federal city might be complete and in compact form, a list has been prepared from the old records in this office during the year, showing the squares and lots assigned to the original proprietors of land within the original limits of the city under the terms of the agreement dated March 30, 1791, between the Commissioners of Public Buildings and the original proprietors.

## EXTENSIONS OF BUILDINGS BEYOND THE BUILDING LINES IN THE CITY OF WASHINGTON.

The act of Congress approved March 3, 1891 (vol. 26, Stat. L., p. 868), provides that no permits shall hereafter be granted for the extension of buildings beyond the building line except with the concurrent approval of the Secretary of War.

This office, by direction of the Secretary of War, is charged with investigation and report on these cases. During the fiscal year ending June 30, 1901, 436 applications have been referred from the War Department and reported on by this office.

## RESERVATIONS WHICH ARE THE PROPERTY OF THE UNITED STATES OCCUPIED, IT IS BELIEVED, IN VIOLATION OF LAW.

[See map in annual report for 1894.]

The following reservations, claimed as the property of the United States, are now occupied, it is believed, without authority of law:

Reservation No. 125, by the Central Union Mission, as a place of worship.

Reservation No. 186, by the Bethany Chapel of the New York Avenue Presbyterian congregation.

Reservation No. 249 is occupied as a lumber yard by a man who claims to rent it from a man in Port Deposit, Md.

Reservations Nos. 137, 138, 141, 152, 164, and 169 have been inclosed with iron or wire fences and partially improved by the owners of adjacent property.

The following also are improved and utilized by adjacent property owners: Nos. 65, 67, 139, 143, 161, 162, 167, 168, 175, 208, and 284.

### UNITED STATES RESERVATIONS GIVEN TO RAILROADS.

By act of Congress approved February 12, 1901 (Public No. 49), which provides a new method of entering the city by the Baltimore and Potomac Railroad, involving the abolition of grade crossings, the following United States reservations are given to the said railroad company:

| | Acres. | Square feet. |
|---|---|---|
| Part of reservation: | | |
| No. 4, Henry Park | 11 | 18,740 |
| No. 17, Garfield Park | 12 | 630 |
| All of reservation: | | |
| No. 113 | 2 | 11,376 |
| No. 114 | | 10,428 |
| No. 115 | | 8,075 |
| No. 116 | | 4,625 |
| No. 117 | | 16,775 |
| No. 118 | | 14,414 |
| No. 119 | | 405 |
| No. 120 | | 4,032 |
| No. 121 | | 2,580 |
| No. 127 | | 25,972 |
| No. 197 | | 4,402 |
| No. 198 | | 5,029 |
| No. 199 | | 4,132 |
| No. 200 | | 10,098 |
| No. 287 | | 2,929 |
| No. 288 | | 11,462 |
| No. 289 | | 1,520 |
| | 25 | 158,624 |

or 28.64 acres.

By act of Congress approved February 12, 1901 (Public No. 50), which provides a new method of entering the city by the Baltimore and Ohio Railroad, involving the abolition of grade crossings, the following United States reservations are given to the said railroad company:

| | Square feet. |
|---|---|
| All of reservation: | |
| No. 79. | 1,205 |
| No. 224 | 25,240 |
| No. 225 | 4,508 |
| No. 226 | 23,482 |
| No. 227 | 4,628 |
| No. 228 | 7,093 |
| | 66,156 |

or 1.52 acres.

### MONUMENT AND WHARF AT WAKEFIELD, VA., THE BIRTHPLACE OF WASHINGTON.

No work has been done during the year beyond the usual care extended by the United States watchman in charge.

As heretofore reported, the wharf was damaged by high tide and wind on Tuesday, October 18, 1898. There are no funds available for repairing the wharf and nothing can be done until an appropriation is provided for the purpose by Congress.

In June, 1899, a resident of Wakefield was granted a revocable license by the War Department to repair the wharf with a temporary flooring on spruce-pine piles at his own expense and without cost to the United States, and under that permit, in July and August, he constructed a 10-foot bridgeway on 8 pine piles connecting the two broken ends of the wharf and has since that time utilized the wharf for loading schooners with lumber.

### UNITED STATES WHARF PROPERTY, WASHINGTON, D. C.

By the act of Congress approved March 3, 1899, entitled "An act relative to the control of wharf property and certain public spaces in the District of Columbia," the following-described property is placed under the immediate jurisdiction and control of the Chief of Engineers of the United States Army: "The banks of the Potomac River from the north line of the Arsenal grounds to the southern curb line of N street south." * * *

By letter of March 11, 1899, from the office of the Chief of Engineers, I was directed, as representative of the Chief of Engineers, to assume control of the said wharf line.

This wharf property is in a very unsightly and dirty condition, covered with tumbled-down buildings, old useless piles, and pieces of wharf, house boats, squatters, etc. It should be cleared off and cleaned up, old piles and useless and rotten buildings and cabins torn down, and be put in a condition for future improvements.

There have been many legal obstacles to be overcome by the United States in getting possession of this wharf property since the decision of the supreme court of the District of Columbia in its favor May 1, 1899.

The United States district attorney has had charge of the matter and on March 25, 1901, issued the following notice to those in possession or occupancy of wharf property:

> By the terms of section 1 of the act of Congress approved March 3, 1899, entitled "An act relative to the control of wharf property and certain public spaces within the District of Columbia," it is provided that "the Commissioners of the District of Columbia shall have the exclusive charge and control of all wharf property belonging to the United States or to the District of Columbia, within said District, including all wharves, piers, bulkheads and structures thereon, and water adjacent thereto within the pier lines, and all slips, basins, docks, water fronts, land under water and structures thereon," except as to the wharf property, etc., along the part of the Potomac River extending from the north line of the Arsenal grounds to the southern curb line of N street south, which is placed under the immediate jurisdiction and control of the Chief of Engineers.
>
> Other provisions of this act confer upon said Commissoners and upon said Chief of Engineers power and authority "to make all needful rules and regulations for the government and proper care of all the property placed in their charge and under their respective control by the provisions of section 1 of this act," "and to make and enforce rules and regulations in regard to building and repairing wharves, the rental thereof, and the rate of wharfage."
>
> #### NO ARRANGEMENT REGARDING RENT.
>
> I am informed by the Commissioners and by the Chief of Enginners that since the passage of this act you have made no arrangement with them in regard to the payment of rent for the wharf property on the Potomac River which has been in your possession and occupation, and as it was obviously the intention of Congress that

such possession and occupation should be upon the basis of a payment of rental, I now beg leave to notify you that in the proceedings to be had under the act approved March 2, 1901, entitled "An act relative to the suit instituted for the protection of the interest of the United States in the Potomac River flats," I shall on the 3d day of April, 1901, at 10 o'clock a. m., or as soon thereafter as the same can be heard, make application to the court in the case of the United States *v.* M. F. Morris and others, instituted under the act of Congress entitled "An act to provide for protecting the interests of the United States in the Potomac River Flats," approved August 5, 1886, and recently remanded by the Supreme Court of the United States to the supreme court of the District of Columbia, in order to carry out said mandate and also to carry into full effect the provisions of an act of Congress approved March 3, 1899, for a rule upon you to show cause why your said possession and occupancy of said wharf property shall not cease and terminate and the same be forthwith surrendered to the United States; and you are also hereby notified that in the further proceeding to be had under said act approved March 2, 1901, I shall claim on behalf of the United States as an offset to any finding in your favor for the value of wharf structures and improvements the reasonable value of the use and occupation which you have had of the property of the United States from at least the date of the passage of said act of Congress approved March 3, 1899, until your said possession and occupancy of said wharf property shall have been duly surrendered to the United States.

THOMAS H. ANDERSON,
*Attorney of the United States in and for the District of Columbia.*

This office is not informed of any further legal steps in the matter up to June 30, 1901.

### SUMMARY OF WORK DONE DURING THE YEAR.

For convenience of reference a brief summary of the more important items of work accomplished during the year is given as follows:

*Executive Mansion.*—The arrangement of water supply, waste, and soil pipes in the central shaft improved by removing the old pipes and replacing them in a better way with new pipes. An automatic fire-alarm system placed in attic, with connections to street fire-alarm box and front door of mansion. A new range and hot-water boiler placed in small kitchen. The private dining room repapered, redecorated, woodwork repainted, and new floor matting laid. Main corridor, first floor, repainted and redecorated, the frames of the seven large portraits hanging in the apartment repaired and regilded, the furniture reupholstered and re-covered with new silk tapestry, the woodwork in the west end of the corridor repainted, and new matting and carpets laid on the stairways therefrom. Fourteen doors in corridor, second floor, refinished and rehung with new cast-brass hinges, and a suite of new furniture purchased for the apartment. The second flight of stairs leading to offices strengthened. A new electric call-bell system installed for use of offices. A complete inventory of the public property prepared. Plans, with estimates of cost, for extending the mansion prepared. Woodwork of two office rooms and two halls repainted. One bathroom and one dressing room repapered and repainted. The north and south porticos and walls of house under same and the roof repainted, and miscellaneous painting done in interior of house. New carpets purchased for four rooms and two small halls, and new straw matting for one room and two stairs and landings. The old wooden superstructure of conservatory repaired, and its interior and exterior repainted. Repairs and improvements made in the stable.

*Washington Monument.*—An addition to the boiler house constructed and a new electric elevator installed; the work of stiffening 'the tie-rods of the iron columns within which the elevator car runs completed;

some of the iron work in shaft painted; new electric-light wires run, and the 70-volt lamps replaced with lamps of 110 volts.

*Public grounds, etc.*—Twenty of the small unimproved reservations at intersections of streets with avenues, comprising 2.91 acres, brought to their first stage of improvement. Marking stones placed at the corners of 70 reservations. Truxtun Circle, comprising 0.259 acre, highly improved. The large iron fountain in reservation 22 removed therefrom and reerected in Truxtun Circle and a smaller fountain constructed in reservation 22. Reservations Nos. 62, 64, and 188 still further improved by the construction of gravel walks around the statues erected in those reservations. An iron post and chain fence erected around one reservation. A new roadway entrance constructed opposite Fifteenth and B streets northwest to one of the main roadways in the Monument grounds, and three heavy brick and cement piers constructed at the entrance. The old frame house, erected in 1888 by a trespasser on reservation 293, was torn down and the material removed. Six additional gas lamps and lamp-posts erected in Seaton Park. An additional propagating house constructed at the nursery, the frame work of one of the greenhouses rebuilt, and a new office building (formerly the photograph building belonging to the Treasury Department) erected, and the grounds around same laid out and improved; 984,000 plants for stock and planting in parks propagated at the gardens. Some iron fencing, which had been removed from the site of the Sherman statue, erected on the east, west, and south sides of the nursery grounds. Part of the Fifteenth street roadway on east side of those grounds graded. A large quantity of old material stored in the property yard sold at auction, the grounds cleared up, and the work of filling up low portions of the grounds continued; 10,980 loads of good earth filling having been received and spread. Some of the old wooden store sheds in the nursery grounds torn down, a new brick and iron storehouse constructed, and work commenced and well advanced for the erection of a brick building for shops. A plan prepared and submitted, accompanied with estimate of cost, for improving that section of the District of Columbia south of Pennsylvania avenue and north of B street southwest, and for a suitable connection between the Potomac and Zoological parks. The statues of General Logan and General Albert Pike completed. Fifteen hundred feet of granite coping purchased and about one-half of it set in position around the site of the statue of General Sherman, and work in connection with that statue continued. One hundred young trees and 1,750 young shrubs planted. Four of the watchmen's lodges, parts of six others, the light iron railing fence inclosing reservation 179, the iron picket fence on northwest side of Executive Mansion grounds, 414 posts, 294 lengths of chain and 95 bars in fences inclosing reservations, 98 lamp-posts and 88 gas lamps painted. One thousand and ninety-two feet of additional water pipe laid. Fifty-six feet of cobblestone gutter constructed and 438 feet of drainpipe laid. Asphalt pavements in the parks extended by the construction of 2,410 square yards of foot walks; 240 square yards of asphalt roadway and 455 square yards of asphalt foot walk repaired and resurfaced. Electric storage batteries purchased for replacing the old gravity main battery of the departmental telegraph line. The work of preparing a list of all lots in the District of Columbia sold by the United States completed, and a list showing the squares and lots assigned to the original proprietors prepared. Four hundred and thirty-six applications for permits for the erection of projections beyond the building line investigated and reported upon. Repairs and improvements made in stable of public buildings and grounds.

*List of stock propagated, purchased, and presented for public grounds.*

| | 1900-1901. | | | 1899-1900. | | | 1898-1899. | | | 1897-1898. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Kind. | Number of varieties. | Number. | Kind. | Number of varieties. | Number. | Kind. | Number of varieties. | Number. | Kind. | Number of varieties. |
| PROPAGATED. | | | | | | | | | | | | |
| Plants for stock and park planting | 924,011 | 40 | 125 | 764,794 | 62 | 170 | 720,053 | 50 | 284 | 506,285 | .... | [illegible] |
| Plants for grounds, Treasury Department | 21,330 | 19 | 26 | 13,919 | 15 | 24 | ........ | .... | .... | ........ | .... | .... |
| Plants for grounds of State, War, and Navy Departments | 18,875 | 10 | 18 | 3,750 | 7 | 13 | 3,035 | 6 | 10 | 2,500 | 6 | 10 |
| Plants for miscellaneous distribution | 20,000 | 15 | 80 | 1,500 | 25 | 100 | 18,397 | 25 | 100 | 15,000 | 6 | 25 |
| | 984,216 | 84 | 249 | 783,963 | 109 | 307 | 741,485 | 81 | 394 | 523,785 | 12 | [illegible] |
| PURCHASED. | | | | | | | | | | | | |
| Hardy flowering bulbs | 94,500 | 6 | 30 | 74,500 | 6 | 27 | 74,200 | 6 | 32 | 49,929 | 6 | 31 |
| Plants | 1,458 | 27 | 44 | 2,096 | 28 | 49 | 1,123 | 12 | 50 | 555 | 14 | 46 |
| Cuttings | 2,000 | 1 | 1 | ........ | .... | .... | ........ | .... | .... | ........ | .... | .... |
| Trees | 714 | 32 | 65 | 380 | 10 | 16 | 390 | 15 | 27 | ........ | .... | .... |
| Shrubs | 582 | 11 | 11 | 1,307 | 17 | 40 | 475 | 9 | 13 | ........ | .... | .... |
| Tender flowering bulbs | 1,750 | 2 | 4 | ........ | .... | .... | ........ | .... | .... | ........ | .... | .... |
| PRESENTED. | | | | | | | | | | | | |
| Japanese lily bulbs | 3,200 | 1 | 1 | ........ | .... | .... | ........ | .... | .... | ........ | .... | .... |

| | 1900-1901. | 1899-1900. | 1898-1899. | 1897-1898. |
|---|---|---|---|---|
| Grown in greenhouses for autumn, winter, and spring bloom: | | | | |
| Swainsonia | ........ | ........ | ........ | 350 |
| Bouvardia | 1,020 | 800 | 600 | 161 |
| Poinsettia | 800 | 720 | 500 | 115 |
| Alyssum | ........ | 200 | 200 | ........ |
| Asparagus | 518 | 300 | 300 | 300 |
| Carnations | 5,516 | 2,157 | 1,542 | 1,507 |
| Pansies | ........ | ........ | ........ | 456 |
| Roses | a 2,325 | a 2,279 | a 1,807 | 1,796 |
| Violets | 1,000 | 1,000 | 2,136 | 1,845 |
| Smilax | 1,800 | 4,385 | 3,135 | 3,510 |
| Chrysanthemum | 1,500 | 2,775 | 3,450 | ........ |
| Potted and boxed for winter forcing: | | | | |
| Lilium | 1,000 | 1,200 | 700 | 700 |
| Japonica | 200 | 200 | 200 | 300 |
| Lily of valley, pips | 10,000 | 5,000 | 5,000 | ........ |
| Narcissus | 5,000 | 3,000 | 2,000 | 3,000 |
| Roman hyacinths | 15,000 | 10,000 | 8,000 | 6,000 |
| Dutch hyacinths | ........ | 3,000 | 8,000 | 2,000 |
| Tulips | 6,500 | 7,000 | 5,000 | 2,606 |
| Freesia | 2,000 | 2,314 | 4,305 | 5,000 |
| Carnations | 500 | 2,708 | 1,000 | 1,000 |
| Miscellaneous | 2,000 | 2,000 | 2,000 | 2,700 |
| Planted at propagating gardens: | | | | |
| Gladiolus bulbs | 750 | 1,300 | ........ | 2,800 |
| Tuberose bulbs | 710 | ........ | ........ | ........ |
| Pansy plants | 1,680 | 764 | 1,000 | 1,065 |
| Chrysanthemums | 364 | 500 | 3,710 | 1,280 |
| Trees for stock | 714 | 380 | 390 | ........ |
| Shrubs for stock | 723 | ........ | ........ | ........ |
| Carnations | ........ | ........ | ........ | ........ |
| Dianthus | 750 | 755 | ........ | ........ |

(a) Six varieties.

*List of stock propagated, purchased, and presented for public grounds*—Continued.

| | 1900–1901. | 1899–1900. | 1898–1899. | 1897–1898. |
|---|---|---|---|---|
| Planted at propagating gardens—Continued: | | | | |
| Pyrethrum | 500 | 375 | 300 | 300 |
| Geraniums | 100 | 220 | 500 | 500 |
| Magnolia grandiflora | 600 | ........ | ........ | 974 |
| Miscellaneous for flowering | 10,000 | 5,412 | 19,378 | 7,812 |
| Miscellaneous for stock | 3,000 | 3,000 | | |
| Planted in the parks: | | | | |
| Trees | 100 | 82 | 152 | ........ |
| Shrubs | 1,257 | 1,153 | 759 | 307 |
| Planted in parks in autumn: | | | | |
| Chrysanthemums | 13,419 | 9,550 | 9,794 | 5,408 |
| Planted for spring bloom: | | | | |
| Spring flowering bulbs | 91,190 | 89,375 | 86,259 | 85,665 |
| Pansies | 20,134 | 5,460 | 5,874 | ........ |
| Sent out in April, May, and June: | | | | |
| Bedding plants | 723,241 | 640,712 | 679,862 | 454,473 |
| Tropical and subtropical | 6,000 | 1,265 | 3,072 | |
| Vases stocked: | | | | |
| Number | 21 | 27 | 26 | 21 |
| Plants | 1,000 | 1,408 | 1,356 | 1,000 |
| Plants furnished other Departments, etc.: | | | | |
| State, War, and Navy Departments | 18,875 | 8,750 | 3,035 | 2,500 |
| Treasury Department | 21,330 | 13,919 | ........ | ........ |
| Post-Office Department | 660 | 700 | 500 | ........ |
| Hospitals, etc | 10,000 | ........ | ........ | ........ |
| Miscellaneous | 20,000 | 15,000 | 18,397 | ........ |
| Total furnished other Departments, etc | 70,865 | 33,369 | 21,932 | 2,500 |

### PUBLIC INSTITUTIONS FURNISHED WITH SURPLUS BEDDING PLANTS, 1901.

Government Printing Office.
Botanic Gardens.
Washington Aqueduct.
United States Jail.
United States Marine Barracks.
United States Naval Hospital.
United States Army Hospital.
Freedmen's Hospital.
Columbia Hospital.
Providence Hospital.
Children's Hospital.
Emergency Hospital.
Homeopathic Hospital.
Garfield Hospital.
Washington Barracks.
District of Columbia police and fire stations.
Post-Office Department.
United States Soldiers' Home.
Howard University.
United States Weather Bureau.
Interior Department.
Census Office.
Treasury Department.
Bureau of Engraving and Printing.

*Estimates for the fiscal year ending June 30, 1903*

| | |
|---|---|
| Salaries of employees, public buildings and grounds, etc.: | |
| 1 assistant engineer in office public buildings and grounds | $1,800.00 |
| 1 office clerk | 1,800.00 |
| 1 office clerk | 1,600.00 |
| 1 messenger | 840.00 |
| 1 landscape gardener | 2,000.00 |
| 1 surveyor and draftsman | 1,500.00 |
| Overseers, draftsmen, copyists, foremen, gardeners, mechanics, and laborers | 35,000.00 |
| 1 sergeant of park watchmen | 900.00 |
| 1 day watchman in Lafayette Park | 720.00 |
| 1 day watchman in Franklin Park | 720.00 |
| 2 day watchmen in Smithsonian grounds, at $720 each | 1,440.00 |
| 2 night watchmen in Smithsonian grounds, at $720 each | 1,440.00 |
| 1 day watchman in Judiciary Park | 720.00 |
| 1 night watchman in Judiciary Park | 720.00 |
| 1 day watchman at Lincoln Park and adjacent reservations | 720.00 |

| | | |
|---|---|---|
| Salaries of employees, etc.—Continued. | | |
| 1 day watchman at Iowa Circle | $720.00 | |
| 1 day watchman at Thomas Circle and neighboring reservations | 720.00 | |
| 1 day watchman at Washington Circle and neighboring reservations | 720.00 | |
| 1 day watchman at Dupont Circle and neighboring reservations | 720.00 | |
| 1 day watchman at McPherson and Farragut parks | 720.00 | |
| 1 day watchman at Stanton Park and neighboring reservations | 720.00 | |
| 2 day watchmen at Henry (Armory) and Seaton parks, at $720 each | 1,440.00 | |
| 2 night watchmen at Henry (Armory) and Seaton parks, at $720 each | 1,440.00 | |
| 1 day watchman at Mount Vernon Park and adjacent reservations | 720.00 | |
| 2 day watchmen at grounds south of Executive Mansion, at $720 each | 1,440.00 | |
| 1 night watchman at grounds south of Executive Mansion | 720.00 | |
| 1 watchman for greenhouses and nursery | 720.00 | |
| 1 day watchman at Monument Park | 720.00 | |
| 1 night watchman at Monument Park | 720.00 | |
| 1 day watchman at Garfield Park | 720.00 | |
| 2 night watchmen at Garfield Park, at $720 each | 1,440.00 | |
| 1 watchman for the care of the monument and dock at Wakefield, Va., the birthplace of Washington | 300.00 | |
| | | $66,620.00 |
| Contingent expenses, public buildings and grounds: For contingent and incidental expenses, including purchase of professional and scientific books and periodicals, books of reference, blank books, photographs, and maps | | 600.00 |
| Improvement and care of public grounds: | | |
| Improvement and maintenance of grounds south of Executive Mansion | $4,000.00 | |
| Ordinary care of greenhouses and nursery | 2,000.00 | |
| Ordinary care of Lafayette Park | 1,000.00 | |
| Ordinary care of Franklin Park | 1,000.00 | |
| Improvement and ordinary care of Lincoln Park | 2,000.00 | |
| Care and improvement of Monument grounds | 5,000.00 | |
| Continuing improvement of reservation No. 17 and site of old canal northwest of same | 2,500.00 | |
| Construction and repair of post-and-chain fences, repair of high iron fences; constructing stone coping about reservations; painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; manure and hauling the same and removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime whitewashing, and stock for nursery; flowerpots, twine, baskets, wire, splints, moss, and lycopodium, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances, cleaning statues, and repairing pedestals | 16,050.00 | |
| For improvement, care, and maintenance of various reservations | 20,000.00 | |
| For improvement, care, and maintenance of Smithsonian grounds | 2,500.00 | |
| For improvement, care, and maintenance of Judiciary Park | 2,500.00 | |
| For laying asphalt walks in various reservations | 2,000.00 | |
| For improvement, care, and maintenance of grounds of Executive Departments | 1,000.00 | |
| For improvement and maintenance of Executive Mansion grounds (within iron fence) | 1,000.00 | |
| For the employment of an engineer by the officer in charge of public buildings and grounds | 2,400.00 | |

| | | |
|---|---|---|
| Improvement and care of public grounds—Continued. | | |
| For purchase and repair of machinery and tools for shops at nursery and for grading around the building | $2,000.00 | |
| For broken-stone road covering for parks | 2,000.00 | |
| For curbing and flagging for park roads and walks | 2,000.00 | |
| For granite coping for Franklin Park, 1,800 feet, at $5 per foot | 9,000.00 | |
| For improvement of Iowa circle | 5,000.00 | |
| For purchase, repair, and reconstruction of granite posts and iron fencing and park vases injured by fire and otherwise in consequence of stands erected for inaugural ceremonies, March 4, 1901 | 2,500.00 | |
| | | $87,450.00 |
| Care, repairs, fuel, etc., Executive Mansion: | | |
| For care, repair, and refurnishing Executive Mansion, to be expended by contract or otherwise, as the President may determine | 20,000.00 | |
| Fuel for Executive Mansion, greenhouses, and stable | 3,000.00 | |
| For material and labor for subdraining driveways in south grounds of Executive Mansion | 2,000.00 | |
| For care and maintenance of conservatory and greenhouses. | 9,000.00 | |
| For repairs to conservatory and greenhouses | 4,500.00 | |
| | | 38,500.00 |
| Lighting the Executive Mansion and public grounds: | | |
| Gas, pay of lamplighters, gas fitters, and laborers; purchase, erection, and repair of lamps and lamp-posts; purchase of matches and repairs of all kinds; stoves, fuel, and lights for office and office stable, for watchmen's lodges, and for greenhouses at the nursery: *Provided*, That for each 5-foot burner not connected with a meter in the lamps on the public grounds not more than $20 shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair, under any expenditure provided for in this act, and said lamps shall burn every night on the average from forty-five minutes after sunset to forty-five minutes before sunrise; and authority is hereby given to substitute other illuminating material for the same or less price, and to use so much of the sum hereby appropriated as may be necessary for that purpose. | 12,500.00 | |
| For lighting 6 electric arc lights in Executive Mansion grounds, within the iron fence, 365 nights, at not exceeding $72 per lamp per annum | 432.00 | |
| For introducing, lighting, and maintaining 6 electric arc lights at the propagating gardens, at 27 cents per light per night for 365 nights | 591.30 | |
| | | 13,523.30 |
| Lighting public grounds, District of Columbia: | | |
| For lighting 7 electric arc lights in grounds south of Executive Mansion, 365 nights, at not exceeding $72 per light per annum | 504.00 | |
| For lighting 32 electric arc lights in Lafayette, Franklin, Judiciary, and Lincoln parks, 365 nights, at not exceeding $72 per light per annum | 2,304.00 | |
| For lighting 14 electric arc lights in grounds south of Executive Mansion and Monument Park, 365 nights, at not exceeding $72 per light per annum | 1,008.00 | |
| | | 3,816.00 |
| Repairs to water pipes and fire plugs: | | |
| Repairing and extending water pipes, purchase of apparatus for cleaning them, purchase of hose, and for cleaning the springs and repairing and renewing the pipes of the same that supply the Capitol, the Executive Mansion, and the building for the State, War, and Navy Departments | | 2,500.00 |
| Telegraph to connect the Capitol with the Departments and the Government Printing Office: | | |
| For care and repair of existing lines | | 1,500.00 |
| Total | | 147,289.30 |

*Washington Monument, elevator, electric lights, and machinery connected therewith.*

The following estimate for operating the elevator, the electric lights, and the machinery connected therewith for the fiscal year ending June 30, 1903, is submitted:

| | |
|---|---|
| 1 custodian, at $100 per month | $1,200.00 |
| 1 steam engineer, at $80 per month | 960.00 |
| 1 assistant steam engineer, at $60 per month | 720.00 |
| 1 fireman, at $50 per month | 600.00 |
| 1 assistant fireman, at $45 per month | 540.00 |
| 1 conductor of elevator car, at $75 per month | 900.00 |
| 1 attendant on floor, at $60 per month | 720.00 |
| 1 attendant on top floor, at $60 per month | 720.00 |
| 3 night and day watchmen, at $60 per month | 2,160.00 |
| For fuel, lights, oil, waste, packing, tools, matches, paints, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors, repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery, and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric plant in good order | 2,500.00 |
| Total | 11,020.00 |

As some of the preceding estimates are larger than amounts heretofore appropriated, and as some of them are new, the following explanations thereof are submitted:

1. *Purchase and repair of machinery, tools, etc.*—As Congress has appropriated for a new building for shops, which will soon be completed, it is necessary for the public service that some provision should be made for tools. Boiler, engine, and some shafting can perhaps be obtained without additional expense to the United States; but the drill press now in use by the blacksmith is very old and almost useless; a new forge is also necessary; the carpenters need a good lathe and a plane and a mortising machine; the tinners need a bending machine, etc. Besides this, the estimate and appropriation were so close that it was not possible to do more than finish the building, without any balance for cleaning up and grading around it.

*2 and 3. Broken-stone road covering for parks, and curbing and flagging for park roads and walks.*—The appropriations for parks are so closely made that with an ever-increasing area of improved ground it has been found impossible to reserve any sums which are effective for the much-needed improvement of driveways.

*4. Granite coping for Franklin Park.*—It being the wish of Congress that the public parks should be as open as possible, all the former high iron fences have been removed except where absolutely needed. This has left the edges of the parks with an unfinished appearance, which in many cases is very unsightly.

It has been found by experience that a simple stone curbing gives a pleasing finish and is sufficient to preserve a neat border line between park and sidewalk. Lafayette square is an illustration.

Franklin Park, one of the prettiest and most frequented in Washington, suffers for lack of this. A simple but tasteful granite curb can be laid around it for $9,000 or less, and the appropriation of this amount is respectfully urged.

*5. Improvement of Iowa circle.*—This circle is already well improved, but the completion of the statue of General Logan has given a certain permanence, which it is desired to round out by a granite curbing and rearrangement of the shrubbery.

*6. Purchase, repair, and reconstruction of granite posts, etc., at north entrance to West Executive avenue.*—The reasons and need for this estimate are given at length in this report on pages 3703 and 3704.

7. *Subdraining driveways, south grounds of Executive Mansion.*—As explained in my annual report for 1900, the driveways in the south grounds of the Executive Mansion are so insufficiently drained that every heavy rain does much damage by washing gravel out of the driveways and walks and washing out and filling up the brick gutters, causing a heavy drain on the regular force for frequent repairs. It is desired to correct this by reconstructing the drainage and properly providing for rainfalls.

8 and 9. *Care, maintenance, and repair of conservatory and greenhouses, Executive Mansion.*—The regular appropriation is for care and repair of greenhouses $5,000 and for repairs to conservatory $2,000. Out of the first amount about $2,500 is used for repairs. My estimate this year in this regard is not new, but merely a combination of usual amounts for repairs.

For the care and maintenance of conservatory and greenhouses, however, the usual appropriations have practically given only $2,500 a year. In order to keep up these establishments properly (and a great deal of national pride is taken in them by all visiting citizens), it has been found necessary to use about $6,500 out of general park funds. The additional estimate is simply this amount transferred to the Executive Mansion appropriation, where it properly belongs, thus relieving the general park appropriation of this heavy burden.

10. *Arc Electric Lights at the propagating gardens.*—The large and valuable nursery at the propagating gardens is insufficiently guarded and lies in a lonely part of the city. The arc lights are asked for as a kind of police protection.

*Financial statement for fiscal year ending June 30, 1901.*

| Title of appropriation. | Available at beginning of fiscal year. | Appropriated since. | Expended during fiscal year. | Pleged by contract. | Unexpended balance to revert to Treasury. |
|---|---|---|---|---|---|
| Improvement and care of public grounds, 1901 | $62,850.00 | ............ | $62,849.38 | ............ | $0.62 |
| Repairs, fuel, etc., Executive Mansion, 1901 | 30,000.00 | ............ | 29,076.56 | ............ | 923.44 |
| Lighting, etc., Executive Mansion, etc., 1901 | 12,952.00 | ............ | 12,944.88 | ............ | 7.12 |
| Lighting public grounds, District of Columbia, 1901 | 3,816.00 | ............ | 3,766.55 | ............ | 49.45 |
| Repairs to water pipes and fire plugs, 1901 | 2,500.00 | ............ | 2,500.00 | ............ | ............ |
| Telegraph to connect the Capitol with the Departments and the Government Printing Office, 1901 | 1,500.00 | ............ | 1,500.00 | ............ | ............ |
| Contingent expenses, public buildings and grounds, 1901 | 700.00 | ............ | 700.00 | ............ | ............ |
| Salaries of employees, public buildings and grounds, 1901 | 62,500.00 | ............ | 61,387.76 | ............ | 1,112.24 |
| Care and maintenance of the Washington Monument, 1901 | 11,520.00 | ............ | 11,203.42 | ............ | 316.58 |
| Improvement and care of public grounds, 1900–1901 | 6,246.48 | ............ | 6,246.48 | ............ | ............ |
| Improvement and care of public grounds, 1901–1902 | ............ | a$11,000.00 | 4,047.48 | ............ | ............ |
| Plans for extension of Executive Mansion | 6,000.00 | ............ | 4,828.81 | ............ | ............ |
| Plans for improvement of section south of Pennsylvania avenue and for connecting Potomac and Zoological parks | 4,000.00 | ............ | 3,115.02 | ............ | ............ |
| Purchase and repair of building where Abraham Lincoln died | 827.00 | ............ | 8.98 | ............ | ............ |
| Electric plant, Washington Monument | 26,500.00 | ............ | 22,360.62 | 1,850.00 | ............ |
| Pedestal for statue of Gen. John A. Logan | 16,499.21 | ............ | 16,499.21 | ............ | ............ |
| Unveiling statue of Gen. John A. Logan | a1,500.00 | ............ | 1,109.06 | ............ | 390.94 |
| Equestrian statue of Gen. William T. Sherman | 47,857.00 | ............ | 4,297.10 | 39,000.00 | ............ |
| Design for a memorial or statue of Gen. Ulysses S. Grant | ............ | b10,000.00 | 76.25 | ............ | ............ |
| Pedestal for statue of Gen. George B. McClellan | ............ | a50,000.00 | ............ | ............ | ............ |

a Sundry civil act March 3, 1901.

b Act (Public—No. 84) February 23, 1901.

In conclusion I desire to express my sincere appreciation of the faithful services rendered during the past year by the entire force in the employment of this office, and particularly to express my sincere appreciation of the efficient and voluminous work done by the landscape gardener, Mr. George H. Brown, and Mr. E. F. Concklin, chief clerk, and by Mr. F. D. Owen, architect, on the plans for White House extension.

I am, General, very respectfully, your obedient servant,

THEO. A. BINGHAM,
*Colonel, U. S. Army,*
*Major, Corps of Engineers.*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*

## APPENDIX A.

*Inventory of public property in the Executive Mansion June 30, 1901.*

### THIRD FLOOR ATTIC.

2 mattresses, hair.
3 commodes, oak.
1 hat rack, walnut.
1 bed, rosewood, double.
1 bed, walnut, double.
1 bed, maple, double.
1 fire screen, glass in mahogany frame; glass is broken.
2 corner seats.
1 wardrobe, rosewood; plate-glass door (mirror).
1 small table, ebonized.
1 bookcase, revolving.
1 bookcase, mahogany.
2 umbrella stands, walnut.
2 side chairs, mahogany.
1 table, round, mahogany.
1 table, marble top, mahogany.
1 table, invalid's, mahogany.
12 umbrella cans, painted green.
2 chairs, side, mahogany, solid wood backs.
1 table, maple, marble top.
1 fire screen, brass.
1 table, breakfast, walnut.
21 awnings, canvas, for windows.
2 awnings, for receptions.
1 awning, for large bow window.
2 fenders, for radiators in vestibule.
1 box, made to go under bed in red bedroom.
2 flags, post.
1 flag, storm.
Curtains, velour; used at receptions in vestibule, private dining room, and state dining room.
9 boxes, pine, with locks; used to store curtains, etc.
1 lot crash, linen; used on floor at receptions.
1 piece crash for east room floor.
2 mattresses, small; used in northwest bedroom between the mattresses.
2 pedestals covered with red plush.
1 lot cocoa matting.
1 cocoa mat.

### THIRD FLOOR ATTIC—continued.

1 nursery ice box.
3 thermometers, round.
2 thermometers.
1 fire extinguisher, Babcock.
50 chairs, camp, wooden; used at collations.
8 tables, round, oak; used at collations.
2 lanterns, tin; 1 oil and 1 for candle.
2 axes.
6 buckets, water, deep round bottoms.
1 section hose, canvas.
1 table, wicker, round.
6 chairs, arm, wicker.
3 rockers, arm, wicker.
4 settees, arm, wicker.
1 truck.

### SECOND FLOOR—NORTHWEST DRESSING ROOM.

50 yards carpet, Wilton.
50 yards matting, white, China.
3 shades, green, Holland.
3 shades, white, Holland.
1 couch, upholstered in blue.
2 chairs, arm, upholstered in blue.
1 seat, window, upholstered in blue.
1 lambrequin, mantel, blue.
1 commode, mahogany.
1 rocker, mahogany, with cushion.
1 chair, side, mahogany.
1 desk, mahogany.
1 safe, iron.
1 screen, mahogany, 3-fold.
1 bureau, mahogany.
1 chiffonier, mahogany.
1 table, invalid's, mahogany.
1 basket, waste paper, wooden.
1 fender, brass.
1 fire-set, brass, complete.
1 fireboard, brass.
2 pair laces, brussels.
1 cuspidor, china.
1 mirror, small, mahogany.
1 chair, side, walnut.
1 foot tub, tin.
1 footstool, wicker, painted white.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### NORTHWEST BEDROOM.

108⅓ yards carpet, Wilton, blue.
108⅓ yards matting, white, China.
2 shades, white, Holland.
2 shades, green, Holland.
2 bedsteads, brass.
2 springs, woven wire.
4 mattresses, hair, 2 pieces each.
8 loose covers for same.
1 couch, upholstered in blue.
2 chairs, arm, upholstered in blue.
1 chair, corner, upholstered in blue.
1 seat, window, upholstered in blue.
3 cushions for rockers.
3 hassocks.
1 mirror in gilt frame.
1 lambrequin, mantel, blue satin damask.
1 screen, 3-fold, blue satin damask.
1 wardrobe, walnut.
2 wardrobes, mahogany.
2 rockers, painted white.
1 rocker, mahogany.
1 table, mahogany.
2 stands, mahogany.
1 table, painted.
1 chiffonier, mahogany.
1 dresser, rosewood.
2 chairs, side, mahogany.
1 fender, brass.
1 fender, spark, wire.
1 fire-set, brass, complete.
2 andirons, brass.
1 fire-board, brass.
1 clock, black marble.
2 pair curtains, heavy, blue satin damask.
2 pair laces.
1 basket, waste-paper, wooden.
1 bookcase, mahogany.
1 cuspidor, china.

### PRESIDENT'S DRESSING ROOM.

6 rugs, oriental.
1 chiffonier, walnut.
1 stand, shaving, mahogany.
1 rack, towel, walnut.
3 chairs, side, walnut, cane seats.
1 wardrobe, walnut.
1 clothes hamper.
1 shade, white Holland.
1 shade, green.
1 cushion for seat.
1 soap dish, nickel.
1 hairbrush, white.
1 comb, white.
1 pin tray.
2 towel racks, nickel.
1 window seat.

### BLUE BEDROOM.

77⅓ yards carpet, Brussels, blue.
77⅓ yards matting, white, China.
1 shade, white Holland.
1 shade, green Holland.
1 pair laces, Renaissance.
2 curtains, heavy, blue satin damask.
2 bedsteads, iron and brass, 3 feet 6 inches wide.

### BLUE BEDROOM—continued.

2 springs for iron and brass bedsteads, 3 feet 6 inches wide.
2 mattresses, hair.
4 pillows, feather.
1 bureau, mahogany.
1 bureau, rosewood.
1 washstand, mahogany.
1 wardrobe, rosewood.
1 table, rosewood, marble top.
1 chiffonier, walnut.
1 desk, walnut.
1 table, lacquered.
1 couch, upholstered in blue damask.
1 chair, Turkish, upholstered in blue damask.
1 chair, arm, upholstered in blue damask.
2 chairs, side, upholstered in blue damask.
1 seat, window, upholstered in blue damask.
3 pillows, sofa, upholstered in blue damask.
1 quilt, silk.
1 basket, waste-paper, wooden.
2 candlesticks, china.
2 vases, glass, engraved.
2 vases, china, decorated in blue.
1 vase, flower, dark green.
1 toilet set, Japanese, 6 pieces.
1 pitcher, water, china.
1 mug, china, small.
1 clock, brass and glass.
1 match safe, wedgwood, blue.
1 mirror, gold frame.
1 mirror, covered plush frame.
1 pair andirons, brass.
1 fender, brass.
1 fire-set, complete—tongs, poker, shovel.
1 vase, flower, glass.
1 ottoman.
1 rocker, cherry.
1 hassock.
1 lamp.
1 shade, silk.
8 slip covers.
1 toilet set, blue, decorated, 8 pieces.

### HALL BEDROOM.

41⅓ yards carpet, Wilton.
41⅓ yards matting, white, China.
1 shade, white Holland.
1 shade, green Holland.
1 pair curtains, Creton.
1 pair curtains, lace, Brussels.
2 beds, single, iron.
2 springs, single.
2 mattresses, hair.
4 pillows, feather.
1 wardrobe, walnut.
1 bureau, rosewood, marble top.
1 chiffonier, walnut.
1 washstand, cherry, marble top.
1 table, walnut, marble top, small.
1 table, lacquered, small.
1 chair, arm, rosewood, upholstered.
2 chairs, side, rosewood, upholstered.
1 chair, side, cherry, cane seat.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### HALL BEDROOM—continued.

1 chair, side, ebonized, upholstered.
1 bookcase, pine.
1 clock, black marble.
1 basket, waste, wooden.
1 toilet set, 5 pieces, odd.
1 foot rest, mahogany, upholstered in leather.
1 pitcher, china, for ice water.
1 tray, silver-plated.
1 sewing machine, Domestic.
3 pillows, sofa, covered with satin damask.

### TERRA-COTTA BED ROOM.

74⅔ yards carpet, Brussels.
74⅔ yards matting, white, China.
1 shade, white Holland.
1 shade, green Holland.
1 pair laces, Brussels.
2 beds, brass, 3 feet 6 inches wide.
2 springs for beds.
4 mattresses, hair.
4 pillows, feather.
1 quilt, silk.
1 dresser.
1 bureau.
1 washstand.
1 wardrobe.
1 chiffonier.
1 table, dressing, marble top.
1 chair, Turkish, upholstered.
1 chair, side, upholstered.
1 couch, upholstered.
1 foot rest, mahogany, covered in leather.
1 clock, black marble.
2 vases, bronze.
2 vases, bronze, small.
1 fender, fire, brass.
1 shovel, brass.
1 pair tongs, brass.
1 poker, brass.
1 stand, brass.
1 basket, iron, grate.
1 mirror, frame covered with plush.
2 bottles, cut glass.
1 basket, waste, wooden.
1 seat, window, upholstered, pink satin damask.
1 pillow, covered with satin damask.
2 statuettes.
1 toilet set, china, 8 pieces.
1 pair candle stands, brass, 3-light, in corridor.
1 towel rack, walnut.
1 picture, Christ in the Temple.
1 picture, Madonna.
1 picture, Madonna at Organ.
1 rocker, maple, with cushion.
10 slip covers.
4 chairs, side, maple, upholstered.
1 desk.

### CABINET ROOM.

1 portrait, President Andrew Johnson.
1 portrait, President Andrew Jackson.
1 portrait, President Zachary Taylor.

### CABINET ROOM—continued.

1 portrait, President William Henry Harrison.
1 portrait, President James Monroe.
1 portrait, President Thomas Jefferson.
1 portrait, President James Madison.
1 portrait, President John Adams.
1 engraving, President George Washington.
1 engraving, President James A. Garfield.
1 flag case for flags of the President, mahogany.
1 screen, fire.

### LIBRARY.

141⅓ yards carpet, Wilton.
141⅓ yards matting, white, China.
3 shades, white Holland.
3 shades, green Holland.
3 pairs laces, Renaissance.
5 pairs curtains, heavy, satin damask.
3 bookcases, walnut, large.
4 bookcases, walnut, small.
1 bookcase, walnut, revolving.
1 table, rosewood, inlaid and carved.
1 table, mahogany, marble top.
2 sofas, upholstered, satin damask.
1 lounge, upholstered, satin damask.
2 chairs, Turkish, upholstered, satin damask.
6 chairs, side, upholstered, satin damask.
1 chair, arm, straight back.
1 chair, arm, rosewood, upholstered.
1 chair, arm, overstuffed, upholstered.
1 easel, walnut.
1 medallion in frame.
1 piano, upright, Bradbury.
1 bronze bust, George Washington.
2 vases, bronze.
2 figures, bronze, women.
1 clock, black marble with bronze top.
1 statue, bronze, equestrian, General Jackson.
2 candelabra, brass, 3 lights.
1 vase, china, decorated in blue and gold.
1 stool, piano, revolving.
1 lambrequin, mantel.
1 fender, brass.
1 fire-set, brass, complete.
1 pair andirons, brass.
2 cuspidors, brass.
1 piano cover, green plush.
1 mat, table, green plush.
1 painting, oil, John Hamden.
1 water color, statue Daniel Webster.
1 mirror, gilt frame.
1 lamp.
1 shade, lamp, umbrella.
1 water color, marine scene.
1 water color, marine scene.
4 vases, old, decorated in gold, urn-shape.

### RED BEDROOM.

103⅔ yards carpet, Brussels.
103⅔ yards matting, white, China.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### RED BEDROOM—continued.

3 pairs laces, Renaissance.
3 pairs curtains, heavy, red satin damask.
2 shades, white Holland.
2 shades, green Holland.
1 bed, double, rosewood, carved.
1 spring, double.
2 mattresses, hair.
1 bolster, feather.
2 pillows, feather.
3 chairs, arm, upholstered in satin.
2 chairs, side, upholstered in satin damask.
1 couch, upholstered in satin damask.
1 rocker, cherry, with cushion.
1 table, handsomely carved.
1 canopy, gilt, over bed.
1 screen, 3-fold, cherry stained.
1 desk, mahogany.
1 bureau, rosewood.
1 dresser, rosewood.
1 wardrobe, walnut.
1 washstand, walnut.
1 towel rack, walnut.
1 pair andirons, brass.
1 fire-set, brass, complete.
1 fender, brass.
1 basket, waste paper, wooden.
1 pair candlesticks, brass and glass.
1 pair statuettes, Fisherman and Fisherwoman.
1 pair statuettes, Boy and Girl.
2 bottles, cut glass.
1 clock, brass and glass.
2 vases, flower, Japanese.
2 vases, white and gold, scenes from the desert.
2 vases, red and gold.
1 match safe, brass.
1 cabinet, wall, ebony.
1 stand, ebony.
1 toilet set, 7 pieces.
1 lamp, electric.
1 shade, lamp, red, umbrella.
10 slip covers.
1 rocker, mahogany, high back.
2 rockers, mahogany, low.
1 cuspidor, china.

### SOUTHWEST BEDROOM.

117⅞ yards carpet, green, Wilton.
117⅞ yards matting, white, China.
2 shades, white holland.
2 shades, green holland.
2 pairs curtains, heavy, light-green satin damask.
2 pairs laces, renaissance.
2 beds, brass, three-quarter.
4 mattresses, hair.
4 pillows, feather.
2 springs.
1 glass, pier, mahogany.
1 washstand, walnut, marble top, high back.
1 wardrobe, mahogany.

### SOUTHWEST BEDROOM—continued.

1 dresser, walnut, marble top.
1 dresser, mahogany.
1 lounge, upholstered.
2 chairs, arm, upholstered.
1 chair, arm, upholstered, high back.
2 chairs, side, upholstered.
2 seats, window, upholstered.
8 pillows, sofa.
1 table, walnut, marble top.
1 table, round, mahogany.
1 toilet set, 7 pieces.
1 fender, brass.
2 andirons, brass.
1 fire-set, brass, complete.
1 basket, waste, brass.
1 clock, black marble.
2 ornaments, black marble, to accompany clock.
2 vases, flower.
1 photograph, in gilt frame, of President Arthur.
1 engraving, in gilt frame.
1 engraving, in gilt frame.
1 table, lacquered.
2 vases, flower, cut glass.
1 vase, flower.
1 mirror, brass oval, easel back.
1 lamp.
1 shade, lamp, silk umbrella.
17 slip covers.

### SOUTHWEST DRESSING ROOM.

38 yards carpet, Wilton, green.
38 yards matting, white, China.
3 shades, white holland.
3 shades, green holland.
1 sofa, upholstered.
1 chair, arm, upholstered.
2 chairs, side, upholstered.
1 seat, window, upholstered.
5 pillows, sofa.
1 bureau, rosewood.
1 desk, writing, inlaid.
1 basket waste paper, wooden.
1 fender, fire, brass.
1 fire-set, brass, complete.
1 basket, grate, iron.
1 sideboard top, oak.
2 figures, bronze storks.
1 figure, bronze pheasant.
2 vases, flower.
2 candlesticks, brass.
1 statuette, bisque.
1 match safe, brass.
1 match safe, bronze.
2 pillows, feather.
2 towel racks, wall, nickel.
1 gas key.
1 bed, folding, walnut.
1 mattress, hair.
1 toilet set, 3 pieces.
1 dish, soap, silver plated.
1 mirror, mahogany.
1 chair, walnut, cane.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### SOUTHWEST DRESSING ROOM—continued.

2 pairs laces, renaissance.
11 slip covers.
1 gas stove.

### UPPER CORRIDOR.

199 yards carpet, Wilton, green.
199 yards matting, white, China.
4 cabinets, ebonized.
2 cabinets, mahogany.
2 stands, mahogany, marble top.
1 table, mahogany, long.
1 clock, mahogany, tall.
2 chairs, arm, mahogany, upholstered in leather.
2 chairs, arm, mahogany, upholstered in satin damask.
4 chairs, side, mahogany, upholstered in satin damask.
2 settees, mahogany, upholstered in leather.
2 chairs, side, mahogany, upholstered in leather.
1 screen, ebonized, 6 fold.
2 seats, corner, upholstered in satin damask.
18 pillows, sofa, covered with satin damask.
1 mirror, tall, ebony frame.
1 stand, mirror, ebony, marble top.
1 painting, oil, General Grant.
1 engraving, Queen Victoria landing at Portsmouth.
1 bowl, covered, papier-maché.
2 jardinieres, brass.
2 vases, high, Italian marble.
1 figure, bronze, woman with Cupid on shoulder.
1 figure, bronze, woman with Cupid at feet.
1 figure, bronze.
1 jardiniere, bronze, low.
1 table, ebony, marble top.
1 table, ebony, square top.
1 stand, ebony, carved.
1 settee, upholstered in green satin damask.
6 chairs, arm, low, upholstered in green satin damask.
1 seat, window, long.
1 cushion, for long window seat, green satin damask.
1 stand, high, mahogany.
1 bookcase, revolving, walnut.
1 rocker, low, mahogany.
1 rocker, high, mahogany, cane seat.
1 figure, bronze, woman with lyre.
1 photograph, framed in oak, cathedral.
1 photograph, framed in oak, Coliseum at Rome.
1 photograph, framed in oak, gladiator.
1 pair portieres.
1 drapery, for bow window.
3 shades, green, Holland.
31 covers, loose.
6 chairs, Turkish.
1 lounge, Turkish.

### UPPER CORRIDOR—continued.

2 hassocks, Turkish.
1 book rack, rosewood, for table.
2 candlesticks, brass, 2-light.
1 placque, China, decorated.
1 easel, brass, for same.
3 vases, Hungarian ware.
1 jardiniere, English ware.
1 vase, flower, Dresden, 4 posts.

### LANDINGS AND STAIRS.

71½ yards carpet, Wilton.
71½ yards matting.
2 chairs, arm, rosewood, upholstered in leather.
2 stands, flower, wood, ebonized.
1 table, walnut, marble top.
1 shade, white, holland.

### FIRST FLOOR—PANTRY.

36 yards linoleum, inlaid.
1 table, breakfast, walnut.
1 table, long, mahogany, covered with oilcloth.
1 refrigerator, Jewett's.
1 hamper, clothes, wicker.
3 shades, white, holland.
1 filter, small, Berkfield.
1 clock, wooden, 8-day.
1 kettle, tea, galvanized iron.
4 chairs, wooden.
1 ice shaver, galvanized iron.
4 trays, japanned.
1 canister, tea, tin, japanned.
2 bread boards.
1 tea pot, nickel.
2 coffee pots, 1 agate ware, 1 tin.
1 pail, agate ware.
1 pail, garbage.
1 box, knife.
1 box, bread.

### PRIVATE DINING ROOM.

115⅓ yards carpet, Wilton.
115⅓ yards matting.
2 pairs drapery, satin damask, red.
2 pairs laces, Brussels.
2 shades, white, holland.
2 screens, fly, wooden frames.
2 rugs, Wilton, with fringe.
1 table, dining, round, mahogany.
2 tables, side, high, marble top.
2 sideboards.
2 tables, side, mahogany, made from dining table, purchased during President Hayes's Administration.
2 mirrors, large, gilt frames.
1 cigar box, tin, square.
1 lambrequin, mantel, covered with red damask.
12 chairs, mahogany, seats upholstered in leather.
1 fender, brass.
1 fire set, brass, tongs, shovel, poker, and stand.
2 andirons, brass.
1 clock, black marble,
2 candelabra, high, bronze and gilt.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### PRIVATE DINING ROOM—continued.

1 figure, bronze, antelope.
1 kettle, tea, brass.
1 stand, brass, for kettle.
2 vases, majolica.
1 jardiniere, blue and white, paintings of birds on sides.
1 jardiniere, Chinese.
1 plate, Chinese.
1 placque, forest scene, deer in the distance.
1 placque.
1 vase, yellow and brown, with stand, English ware.
1 pitcher, fancy, blue, Hungarian ware.
1 teapot, china.

### ANTEROOM.

4 rugs, Turkish, 1 large, 3 small.
1 shade, white Holland.
1 lambrequin, window.
1 table, carved, Flemish oak.
1 seat, carved, Flemish oak.
2 chairs, side, carved, Flemish oak.
1 chair, arm, carved, Flemish oak.
1 fender, wrought iron.
1 fender, spark, Russian iron.
3 vases, Holland delft.
1 painting, Rio de Janeiro bay, painted by Castagueta, 1893.
1 basket, grate.

### VESTIBULE, MAIN.

3 shades, white Holland.
3 chairs, arm, walnut, large.

### HALL, FOOT OF OFFICE STAIRS.

240 yards carpet, Wilton, green.
Matting.
1 desk, walnut.
1 detector, watchman's.
4 chairs, oak, high back.

### EAST ROOM.

476 yards carpet, Wilton, old gold.
476 yards matting, white, China.
9 shades, white Holland.
9 pairs laces, Brussels.
9 pairs curtains, heavy, satin damask.
4 settees, reupholstered in satin damask.
1 divan, reupholstered in satin damask.
12 side chairs, reupholstered in satin damask.
4 corner chairs, reupholstered in satin damask.
8 armchairs, reupholstered in satin damask.
29 loose covers.
1 painting, President George Washington, saved from fire by Dolly Madison.
1 painting, President Thomas Jefferson.
1 painting, President Abraham Lincoln.
1 painting, Mrs. Martha Washington.

### GREEN PARLOR.

96¾ yards carpet, Wilton, solid green color.
96¾ yards matting, white, China, under carpet.

### GREEN PARLOR—continued.

2 shades, window, white Holland.
2 pairs laces, window, renaissance.
2 pairs draperies, window, green satin damask.
1 piano, Knabe, concert grand.
1 sofa, upholstered, green satin damask.
2 chairs, arm, upholstered in green satin damask all over, no frame showing.
3 chairs, upholstered in satin all over as above.
1 Ottoman, upholstered in satin all over as above.
1 seat, tete-a-tete, circular, three seats, upholstered, ditto.
1 stool, piano, upholstered, ditto.
1 cabinet, carved mahogany, tall.
1 mirror, over mantelpiece, gilded wood with United States shield over center at top.
1 mirror, on console table, gilded wood with United States shield over center at top.
1 cabinet, stand and cabinet combined, about 3 feet high, Japanese or Chinese, lacquered and ornamented in gilt.
2 vases, Japanese, about 3 feet high, in carved teak-wood bases.
2 andirons, brass.
1 fender, brass, low, open.
1 fire screen, brass and green damask.
1 fire screen, silk embroidered, United States coat of arms behind glass in black frame.
1 music stand, gilt wood, presented by Austrian minister.
1 statuette, bronze, Diane de Cabies, original said to have been found at Pompeii.
1 clock, gilt bronze and onyx, made by Browne & Spalding, New York.
1 vase, pink, Crown Derby.
1 vase, yellow, Crown Derby.
1 vase, decorated in gold, of porcelain Sevres, no handle, picture of alpine village on banks of a mountain torrent, one high and one low bridge.
1 vase, same, but picture of seaport, mountains in background, in foreground a peasant driving cattle, woman in red sitting on bench, child in blue and red standing by woman (to the right).
1 oil painting, portrait, President Buchanan, by E. F. Andrews.
1 oil painting, portrait, President Jackson, by Andrews.
1 oil painting, portrait, President Van Buren, by G. P. Healy.
1 oil painting, portrait, President Arthur, by Daniel Huntington.
1 oil painting, portrait, President Taylor, by Andrews.
1 table, console, gilded wood, marble top, under mirror.
1 cabinet, mahogany.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### BLUE PARLOR.

161⅓ yards carpet, Wilton, solid color, gray blue.
161⅓ yards matting, white, China, under carpet.
3 shades, window, white Holland.
3 shades, window, light-blue Holland.
3 pairs curtains, lace, renaissance.
3 pairs draperies, window, blue satin damask borders.
1 pair draperies, door.
4 sofas, with backs and arms, gilded wood frames, blue damask upholstered.
4 chairs, arm, gilded wood frames, blue damask upholstered.
4 chairs, without arms, gilded wood frames, seats and backs upholstered in blue damask.
4 chairs, without arms, gilded wood frames and backs, seats upholstered in blue damask.
1 chair, ottoman, upholstered in blue damask; no gilt wood.
2 ottomans, gilded wood frames and legs, upholstered in blue damask.
1 divan, circular, gilded wood frame and 6 legs, upholstered in blue damask, for center of room; gilded bronze top for flowers; 4 square at base, 4 curling supports, and round bowl top with roses in high relief about the rim; 4 Neapolitan pipers between the curling supports.
1 hassock, wilton, to match carpet.
2 andirons, brass.
1 fender, brass, low.
24 covers, furniture, for summer.
15 covers, for damask walls in summer.
2 candelabra, 5-foot gilded bronze, 12 branches in 2 horizontal planes of 6 each; 1 central projecting branch; tripod bases. Said to have been a present from General Patterson, of Philadelphia, to General Jackson.
1 clock, mantel, gilded bronze. Said to be a present from Napoleon I to Lafayette and from him to our Government. Longitudinal pedestal, about 20 by 8 inches; sides covered with bas-reliefs of Roman trophies. On the pedestal a seated female figure, probably Goddess of War or Victory, has a Roman helmet on her head and a wreath in left hand. Made by "Thomière & Cie.," also marked at bottom of dial "Monier Aîne."
2 candlesticks, mantel, gilded bronze, 2 feet high; probably companions of clock; square pedestals on 4 claw feet; winged female figures on two sides of pedestal, carrying wreath in one hand and trumpet or quill pen in other.
2 vases, dark blue sevres, presented by President Faure, of France, to President McKinley at opening of new French cable August 17, 1898.
2 pedestals, decorated wood, for same.
4 pillows or cushions in blue satin damask.
1 mirror, over mantel.
1 mirror, on gilded wood console table, opposite mantel.
2 vases, gilded porcelain, each on a square base in two steps. Each has 2 handles, which are swans' necks and heads. One has a picture of blind old man carrying youth on left arm, staff in right, helmet hanging from belt. The other has picture of blind old man and youth standing on rocks overlooking sea; a lyre hangs from old man's back.
1 vase, corrugated white porcelain, overlaid with pond lilies of same. Base is gilded; marked "Moore."

This room was decorated and the furniture reupholstered, using the old frames, in the summer of 1899, by W. B. Moses & Son, of Washington, D. C., under the direction and supervision of Col. T. A. Bingham, Corps of Engineers, United States Army, officer in charge of public buildings and grounds.

The framework of the furniture has been here at least since 1860-1864.

### RED PARLOR.

115 yards carpet, Wilton, red, white figured.
115 yards matting, white, China.
2 pairs draperies, window, red damask, white figured.
2 pairs laces, window.
2 shades, window, white Holland.
1 table, rectangular, mahogany, carved; selected by President Arthur.
1 table, square, mahogany; selected by President Arthur.
2 cabinets, mahogany; selected by President Arthur.
1 bookcase, mahogany; selected by President Arthur.
1 screen, fire, gilt. Gilded wood surmounted by eagle, silk embroidered center, surrounded by 4 cat-o'-nine tails, showing fireplace in background, man sitting in center before a table carrying the Bible, man kneeling on his right hand, 3 females standing behind him—a male and female servant standing on extreme right of picture. Subject unknown. Made by Edward Richter, Vienna—Centennial Exhibition, 1876. Presented by Austrian minister, January, 1877.
1 screen, fire, brass, brass frame, damask center.
2 andirons, brass.
1 fire-set, steel, brass handles, 4 pieces.
1 mantelpiece, mahogany.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### RED PARLOR—continued.

2 vases (faïence ?), with ebony bases, of President Arthur's time—about 4 feet high. One has a painting of Cupid in Prison, with Roman girl in front of door on one side; on other side a vase on a pedestal, with a fountain and Ionic portico in background. The other has on one side a Roman girl drinking at a tall fountain, 2 doves; on the other side a fluted pillar carrying a fountain bowl containing a dolphin, with a Corinthian portico in background.

2 stands for above, ebony.

1 curtain, damask, for bookcase.

2 table covers, damask.

1 lamp, duplex burner, for kerosene—cut glass, with globe; prize piece at Chicago World's Fair.

1 fender, brass.

1 clock, gilt, by Deriere and Matelin. On top a Roman sword and bowl of rings. At one side is a Roman warrior; on the other side a pedestal and helmet. Below the dial is the word "Cannes," and on the clock pedestal are the words "Trebia" Ⓐ "Trasimene," each on a Roman trophy.

3 scarfs, red satin damask.

2 vases, gilt, companion pieces to the clock. They are worked with handles. There is a band of grapes and grape leaves around the top, and on the center of each vase is a winged head in a wreath.

1 placque, oval, painted, finished in ultramarine and gold. Picture of lady standing against table; 2 cavaliers, 1 standing with hat on; 1 bowing. Dresden ware marked ⚔ P. Selected by President Arthur.

2 candelabra, tall, bronze gilt, female figure standing on a globe—5 branches and 1 center branch. Pedestals have bas-relief Roman trophy.

1 stand, gilded wood, marble top, 4 feet high.

1 jardiniere, green, marked on bottom ŦŦ 207.

2 vases, porcelain, magenta and gold, bracket arms. Each has a picture of French Revolutionary times; 1, a woman between 2 guards, before an examining officer; the other, a woman in jail before examining officer—jailor in background.

1 ewer and basin, green and gilt brass. Ewer has (1) Venus riding a dolphin, 3 Amors, (2) Venus riding a dolphin and looking in hand glass, (3) armors, 1 with bow and arrow. Basin has (1) Neptune riding the sea; (2) Venus driving a dolphin, accompanied by a nymph.

1 bronze group, male figure seated on base of a broken pillar; female figure with face turned away, her right hand in right hand of the man, his left hand on her left shoulder. Marked "Morcan."

1 bronze figure, soldier seated; ancient armor; boar's or bear's head helmet. Left elbow resting on a casket on his left knee, marked "R'tion—Sauvage."

1 bronze figure, ancient warrior, seated, bareheaded, battle-ax or scepter across knees.

1 settee, gilded wood, upholstered in red satin damask.

1 rug, white fur.

2 chairs, arm, rosewood, upholstered in red satin damask.

4 chairs, side, rosewood, upholstered in red satin damask.

1 chair, arm, mahogany, upholstered in striped silk.

2 chairs, arm, gilded wood, upholstered in red satin damask.

2 chairs, side, gilded wood, upholstered in red satin damask.

1 stand, table, brass, 3½ feet high and top of onyx.

2 mirrors, mahogany frames.

1 table, rectangular, mahogany.

1 portrait, President Polk, by Healy.

1 portrait, President Tyler.

1 portrait, President Hayes.

1 portrait, President Harrison.

1 portrait, Mrs. Polk.

1 portrait, Mrs. Tyler.

1 portrait, Mrs. Van Buren.

1 portrait, Mrs. Hayes.

1 portrait, Mrs. Harrison.

1 vase, white and gold, cactus in bloom.

### STATE DINING ROOM.

178 yards carpet, red, Wilton.

178 yards matting, white, China.

5 pairs draperies, old gold damask.

5 pairs laces, renaissance.

5 shades, white, Holland.

2 sideboards, walnut.

4 tables, side, walnut.

40 chairs, mahogany, upholstered in leather.

15 chairs, rosewood, upholstered in leather.

1 urn, china, English, decorated by Franklin.

1 table, breakfast, walnut.

1 table, pine top, covered in oilcloth.

4 candelabra, gilt, 11 lights.

5 stands, gilt, tall.

32 holders, cut glass.

1 group, bronze, pheasant, with young.

3 mirrors, gilt.

1 plateau, in 7 pieces, gilt-framed mirror.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### STATE DINING ROOM—continued.

16 figures, gilt, women with wreaths.
20 ornaments, gilt, used with plateau.
12 chairs, mahogany, upholstered in leather.

### MAIN CORRIDOR.

247 yards carpet, Wilton, red.
247 yards matting, white, China.
4 settees, oak frames, upholstered in red.
2 chairs, arm, oak frames, upholstered in red.
1 pair portieres, old gold plush.
2 mirrors.
2 stands, flower, covered in red plush, selected by President Arthur.
4 pedestals, covered in red plush.
1 pedestal, marble and plaster.
1 pedestal, covered with red plush.
1 bust, marble, President Fillmore.
1 bust, marble, Hon. John Bright, presented by John Bright to President Lincoln.
1 bust, marble, Judge Jay.
1 bust, marble, unknown.
1 bust, marble, Americus.
10 jardinieres, majolica ware.
1 clock, mahogany, President Arthur.
1 painting, President Millard Fillmore.
1 painting, President James A. Garfield.
1 painting, President George Washington.
1 painting, President U. S. Grant.
1 painting, President Grover Cleveland.
1 painting, President John Quincy Adams.
1 painting, President Franklin Pierce.
6 pieces loose covers.
1 bust, President Van Buren.
3 jardinieres.

### ELEVATOR HALL.

10 yards carpet, Wilton, red.
10 yards matting, white, China.
2 seats, upholstered.

### ELEVATOR.

3⅔ yards carpet, Wilton.
3⅔ yards matting, white, China.

### LOWER WEST CORRIDOR.

118⅓ yards carpet, Wilton, red.
118⅓ yards matting, white, China.
1 mirror, walnut, President Grant.
1 table, marble, round; very old.
1 table, marble top, mahogany; said to date from 1800.
2 stands, marble, high.
2 chairs, horn, upholstered.
1 lamp, bronze.
1 shade, red silk.
2 cabinets, mahogany, President Arthur.
2 cabinets, ebonized, President Arthur.
4 jardinieres, Chinese.
1 screen, mahogany, 5-fold.
2 tables, mahogany, small, President Arthur.

### LOWER WEST CORRIDOR—continued.

4 chairs, arm, mahogany, upholstered.
2 chairs, side, upholstered.
2 stands, flower, wooden, stained.
2 urns, brass.
1 rocker, mahogany, high back.

### BASEMENT—STEWARD'S ROOM.

88⅔ yards carpet, Wilton, brown.
88⅔ yard matting, white, China.
2 shades, gray holland.
1 desk, small, walnut.
1 table, walnut, with drawer.
1 table, walnut, marble top.
1 wardrobe, mahogany.
1 washstand, walnut.
1 table, small, walnut.
1 chair, office, revolving.
1 chair, oak, cane seat.
1 table, oak, extension.
1 fender, brass.
1 stove, coal, Ore No. 4.
2 chairs, arm, upholstered in green rep.
1 settee, upholstered in leather.
1 safe, office, Farrell, Herring & Co.
132 candleholders, patent, plated.
11 boxes for candleholders.
1 toilet set, 4 pieces.
1 stand, umbrella, china, blue and white.
1 light, drop, brass, electric.
3 fire extinguishers, glass bulbs.
1 mirror, walnut frame.
1 box, shoe-blacking, walnut.
1 pillow, leather.
1 basket, waste paper.
1 chair, low, walnut.
1 clock, regulator, 8-day, mahogany.
1 clock, cherry, 8-day.
2 rugs, camel's-hair, used on south portico.
64 bobashers, glass.
101 shades, paper, red and silver.
106 shades, paper, pink and silver.
20 shades, paper, yellow and silver.
118 shades, silk, red.
130 shades, silk, yellow.
123 shades, silk, pink.
1 stretcher, carpet, wooden handle.
3 stands for flatirons.
1 coffeepot, small, tin.
1 lot shades, white holland.
12 shades, candle, 4 red, 4 pink, 4 yellow.
1 scarf, blue satin damask.
1 cover, table, red and white.
1 cover, table, red and gold.
1 cover for piano, blue.
1 cover, linen, for piano.
7 pairs curtains, lace.
1 cover, table, for dining-room table.
8 rugs, domestic.
1 clock, brass, out of repair.
2 clocks, small, out of repair.
1 lot slip covers, old.
3 pitchers, water, toilet.
2 jars, slop, toilet.
1 tub, foot, china, toilet.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

BASEMENT—STEWARD'S ROOM—continued.

1 toilet set, 7 pieces.
38 plates, fish, Hayes's set.
34 plates, salad, Hayes's set.
5 plates, oyster, Hayes's set.
17 plates, oyster, odd, Hayes's set.
5 plates, game, Hayes's set.
24 plates, dinner, Hayes's set.
5 plates, soup, Hayes's set.
23 saucers, coffee, Hayes's set.
2 cups, coffee, Hayes's set.
4 cups, after-dinner coffee, Hayes's set.
28 saucers, after-dinner coffee, Hayes's set.
55 plates, dinner, Lincoln set.
3 platters, French china, decorated.
14 plates, soup, Lincoln set.
1 platter, purple border.
6 plates, soup, small, Lincoln set.
7 plates, breakfast, Lincoln set.
9 plates, bread and butter, Lincoln set.
45 plates, small, Haviland, odd.
6 plates, ice cream, Haviland, pink.
6 plates, soup, small, white china.
14 plates, tea, white china.
35 saucers, white, hotel, china.
35 cups, white, hotel, china.
16 plates, butter, individual, odd.
1 lamp, student's, brass.
3 droplights, gas.
13 shades, lamp, odd.
5 lamps, oil, brass.
2 cuspidors, china.
15 rings, copper, used in dishing up to protect edges of dishes.
1 tin pyramid.
6 trunks for storing silver.
1 pail, garbage.
6 buckets, water, galvanized.
1 box, walnut, for storing silver.
3 trays, walnut.
1 bowl, cracker and cheese, china, with top.
1 plate warmer, japanned.
1 jar, glass, large, with top.
1 brass foot for lamp.
1 lamp, piano, brass.
1 bread box, tin.
7 shovels, coal, small.
5 sweepers, carpet.
1 boiler, wash, tin.
15 stands, wooden, used in kitchen.
5 trays, japanned, large.
1 box, tin, for sugar, holds 50 pounds.
1 tray, serving, wooden.
1 chair, wooden.
3 funnels, tin.
1 washboard.
1 lot casters, old.
1 rat trap, wire.
5 megaphones, used at receptions.
4 sets casters, Victor.
5 brackets, brass, used to tie back curtains.
1 cutter, for billiard cues.
1 tip set, for billiard cues.

BASEMENT—STEWARD'S ROOM—continued.

1 marking pot, tin.
124 shades, mica.
1 rubber stamp, figure.
4 stencils, brass.
2 spoons, wooden.
1 spoon, iron.
1 lot swags, left from decorating blue parlor.

SILVER TRUNKS—TRUNK NO. 1.

(Marked M. le Baron de Tuyll. Wooden trunk covered with leather, bound with iron.)

1 tureen, soup, stand, inside and top. Made in France by Christopher. His mark was first used in 1797. All the silver is marked "President's House."
1 platter, large, fancy border, French plate.
1 platter, medium, fancy border, French plate.
1 plate, fancy border, French plate.
5 plates, thread border, French plate.
1 chocolate pot, thread border, silver.
1 caster, wine, thread border, silver.
4 casters, salt.
2 dishes, vegetable, round, with handles, silver.
9 casters, wide, fancy border, silver.
1 sifter, sugar, thread pattern, gilt.
2 spoons, ice cream, gilt.
95 forks, breakfast, beaded pattern, silver. They were made during President Cleveland's second Administration from 84 silver forks and 57 gilt forks that were worn down. These forks were taken to the Treasury Department, weighed, and melted. The silver was then sent to the silversmith's and 96 breakfast and 96 dinner forks made.
47 spoons, tea, thread pattern, silver.
47 knives, fruit, pearl handles, with gilt shield in handle. Gilt.
1 spoon, mustard, without handle, gilt.
1 trunk, oak, bound with iron, brass plate, marked James Monroe.
4 trays, scalloped edge, English plate.
19 plates, fancy border, made by Christopher. His mark was first used in 1797. French plate.
3 platters, French plate, made by Christopher, thread pattern.
1 mug and stand, sirup, plated, marked "President's House."
1 caster, egg, 6 cups and 6 spoons.
2 casters, wine, silver, handle, open work.
4 casters, wine, silver, bought by President Arthur.
1 caster, wine, plated, will hold 3 decanters.
6 skewers, attellettes, 3 eagle and 3 squirrel tops.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### SILVER TRUNKS—TRUNK NO. 1—cont'd.

6 baking shells, shaped like scallop shells, plated.
1 cheese scoop, celluloid handle, plated.
89 knives, pearl handles, English plated.
16 knives, pearl handles, English plated.
108 knives, celluloid handles, plated.
4 serving trays, fancy border, open work, Gorham plate.
6 pans, crumb, plated, thread border.
6 scrapers, crumb, plated, thread border.
38 bouquet holders, leaf pattern, made by Meriden Britannia Company.
6 platters, beaded border, Gorham plate.
2 baskets, cake, without handles, English plate.
2 buckets, ice, with handle, plated.
1 bell, with black marble stand, plated.
1 bell, small, iron bottom, plated.
2 dishes, pudding, with rings, plated.
57 spoons, table, silver, thread border, made by Christopher.
23 spoons, table, silver, thread border.
12 spoons, table, silver, thread border.
2 spoons, table, silver, thread border.
84 forks, dinner, silver, beaded border.
72 forks, breakfast, silver, beaded border.
70 forks, oyster, silver, plain handle.
12 forks, oyster, silver.
1 sugar sifter, silver, thread pattern, Christopher.
1 pair tongs, sugar, gilt, fancy border, Christopher.
2 pairs scissors, grape, silver.
4 forks, salad, beaded pattern, silver.
4 spoons, salad, beaded pattern, silver.
36 spoons, tea, thread pattern. These were originally gilt. French silver.
29 spoons, tea, thread pattern, silver.
24 spoons, tea, thread pattern, silver.
59 spoons, after-dinner coffee, thread pattern.
24 spoons, after-dinner coffee, thread pattern.
2 spoons, berry, fancy border, silver, bought by President Arthur.
2 spoons, salad, thread pattern, silver, bought by President Arthur.
2 forks, salad, thread pattern, silver, bought by President Arthur.
6 rings, napkin, Nos. 1 to 6, silver.
1 scraper, crumb, thread pattern, silver.
2 mustard pots, made by Christopher, French silver.
2 dishes, vegetable, round, with handles, silver.
1 cigar lighter, low, silver.
6 cruets, pepper, 3 for black and 3 for red pepper, tall, bought by President Arthur, silver.
6 cruets, pepper, silver, 3 for black and 3 for red pepper.
2 forks, asparagus, combination, silver.

### SILVER TRUNKS—TRUNK NO. 1—cont'd.

1 fork and spoon combined, silver, for salad.
2 knives, butter, thread pattern.
1 knife, butter, thread pattern.
1 extinguisher, candle, silver, bought by President Arthur.
1 porcupine, silver, for toothpicks.
2 spoons, ice cream, fancy pattern handle, bought by President Arthur.
1 ship, silver, *Hiawatha* purchased at Centennial, Philadelphia, 1876.
1 lake for ship, silver, purchased at Centennial, Philadelphia, 1876.
57 spoons, dessert, thread pattern, French gilt, by Christopher.
10 spoons, gilt, dessert, thread pattern.
12 spoons, gilt, dessert, thread pattern.
1 strainer, tea.
8 spoons, mustard, gilt, thread pattern.
1 spoon, mustard, gilt, very slender.
1 trunk, canvas covered and bound with iron, marked "President's House."
2 bowls, salad, silver, fancy borders, bought by President Arthur.
2 bowls, salad, silver, Gorham, beaded pattern.
2 bowls, salad, silver, Gorham, beaded pattern.
2 dishes, olive, silver, fancy border, bought by President Arthur.
4 candelabra, silver, bought by President Arthur, 5 lights.
2 bowls, sugar; 1 has top.
1 pitcher, cream, French silver, tall, made by Christopher.
1 pitcher, cream, silver, thread border.
1 tea set, 4 pieces for tray.
6 compotes, silver, fancy border, bought by President Arthur.
2 coffeepots, French silver, ivory handles, made by Christopher.
1 teapot, ivory handle, French silver, made by Christopher.
1 teapot, silver, ebony handle, bought by Mrs. Hayes.
2 sauce boats, thread border, silver, bought by President Arthur.
2 stands, thread border, silver, bought by President Arthur.
2 sauce boats, silver, beaded pattern.
2 stands, beaded pattern.
2 sauce boats, silver, beaded pattern.
2 stands, beaded pattern.
2 tongs, sugar, silver, thread pattern.
5 ladles, sauce, silver, thread pattern.
2 ladles, sauce, silver, beaded pattern.
3 ladles, soup, silver, thread pattern.
1 knife, pie, silver, beaded pattern.
12 dishes, bon bon, silver, Gorham, fancy border.
12 dishes, bon bon, silver, Gorham, openwork border.
12 dishes, bon bon, gilt, fancy border.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### SILVER TRUNKS—TRUNK NO. 1—cont'd.

8 spoons, serving, French silver, thread border.
1 kettle and stand, tea, silver, with eagle ornament handle. Kettle is made to tip.
4 compotes, silver, fancy border, openwork.
1 toast rack, silver.
1 toast rack, silver plated.
1 trunk, wooden, covered with leather, iron bound. Brass plate marked "No. 2—M. le Baron de Tuyll."
1 tureen, soup, stand. Inside and top marked "President's House." Was made by Christopher. Mark was first used in 1797 (French mark).
1 platter, French plated, large, fancy border (same mark as above).
2 platters, French plated, medium, thread border (same mark).
5 plates, French plated, thread border (same mark as above).
1 pitcher, cream, silver, ivory handle (same mark as above).
1 pot, hot water, silver, ivory handle (same mark as above).
1 caster, wine, silver, thread border, for 2 decanters (same mark as above).
4 casters, salt, French plated, for 2 cellars each (same mark as above).
48 knives, fruit, gilt (marked as above).
1 sifter, sugar, thread pattern, gilt (marked as above).
2 spoons, berry, gilt, thread pattern (same mark as above).
95 forks, dinner, silver, beaded pattern. Made from 84 silver dinner forks and 57 gilt forks that were worn down during the second administration of President Cleveland. These old forks were taken to the Treasury, weighed and melted; then the silver was sent to the silversmith's and 96 dinner and 96 breakfast forks were made from it.
2 dishes, vegetable, silver, round, with handle on the side, made by Christopher.
11 casters, wine, silver, fancy border, made by Christopher.
10 spoons, salt, gilt, thread pattern, made by Christopher, France.
6 sugar bowls.
1 trunk, covered with leather and bound with iron. Has brass plate marked "Baron de Tuyll."
4 coolers, wine, silver, fancy borders, with tops; made by Christopher, France. The mark was first used in 1797.
1 trunk, covered with black leather and bound with iron. Has no mark.
2 tureens, soup, silver, 3 parts each, stand, inside and top. Top has eagle ornament for a handle. Made by Christopher, France.

### SILVER-PLATED WARE.

32 spoons, table.
8 spoons, tea, German silver.
291 spoons, tea, stamped "President's House."
300 forks, stamped "President's House."
38 knives, ivory handles.
19 knives, plated handles.
2 trays, with handles, large, English plate, marked "President's House."
10 candelabra, 5 lights, Gorham plate.
2 candelabra, 5 lights.
1 pot, coffee, International.
2 dishes, butter.
3 casters, wine.
3 casters, table.
1 dish, chafing.
3 pitchers, water.
3 pitchers, water, fancy border.
2 pitchers, water, large, plain.
6 trays, for pitchers.
1 tea set, for tray, plain.
1 stand, tall, for bouquet holder.
1 candlestick, plain.
24 holders, Ramakin.
15 nutcrackers.
4 lamps, spirit.
5 nutpickers, pearl handles.
11 nutpickers, plated handles.
1 urn, coffee, capacity 3 quarts.
1 tap, champagne.
4 teaspoons, brass, plated.

### GLASSWARE.

82 bowls, finger. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
81 plates, ice cream. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
83 glasses, sherry, stem. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
92 glasses, claret. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
85 bowls, champagne. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
69 tumblers, champagne. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
81 glasses, burgundy. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
97 goblets. Purchased during the administration of Benjamin Harrison. Coat of arms engraved.
12 plates, ice cream. Purchased during the administration of President Benjamin Harrison. Coat of arms engraved.
7 decanters.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### GLASSWARE—continued.

24 saltcellars.
26 bottles, water.
1 dish, celery, flat.
83 glasses, punch, without coat of arms.
7 glasses, cracked.
8 claret jugs, silver tops.
4 decanters, cut glass.
6 dishes, berry, oblong.
3 bowls, rose.
1 bowl, rose.
6 dishes, berry.
7 dishes, olive, with handles.
2 dishes, olive, without handles.
18 dishes, olive.
40 bottles, water. Coat of arms engraved on same.
81 glasses, sauterne, green. Coat of arms engraved on same.
12 glasses, sauterne, green. Coat of arms engraved on same.
63 glasses, burgundy, ruby. Coat of arms engraved on same.
24 glasses, burgundy, ruby. Coat of arms engraved on same.
19 glasses, liqueur. Coat of arms engraved on same.
5 goblets. Coat of arms engraved on same.
19 bowls, finger. Coat of arms engraved on same.
56 dishes, sauce. Coat of arms engraved on same.
11 plates, ice cream. Coat of arms engraved on same.
2 bowls, sugar. Coat of arms engraved on same.
60 glasses, sherry. Coat of arms engraved on same.
7 glasses, Rhine wine. Coat of arms engraved on same.
28 glasses, claret. Coat of arms engraved on same.
25 glasses, punch, tall, with handles. Coat of arms engraved on same.
4 glasses, celery, tall. Coat of arms engraved on same.
19 decanters, tall. Coat of arms engraved on same.
10 stoppers, cut glass.
54 glasses, madeira, ruby.
63 glasses, port.
24 glasses, liqueur, engraved, Roman border, old.
64 glasses, sherry, engraved, Roman, old.
43 glasses, champagne, engraved, Roman, old.
16 glasses, sherry, engraved with vine, odd.
26 glasses, liqueur, stem, engraved with vine, odd.
13 glasses, sauterne, stem, engraved with vine.
11 glasses, sauterne, stem, engraved with vine.
18 glasses, sauterne, stem, engraved with vine.

### GLASSWARE—continued.

64 glasses, white wine, engraved with vine.
29 glasses, claret, engraved with vine.
25 glasses, claret, engraved with vine.
4 glasses, Rhine wine, engraved with vine.
27 glasses, burgundy, engraved with vine.
22 glasses, claret, engraved with vine.
38 bowls, finger, engraved with vine.
23 bottles, water, engraved with vine.
3 dishes, berry, engraved with vine.
6 decanters, with handles, engraved with vine.
6 decanters, engraved with vine.
1 decanter, engraved with vine, old.
1 bottle, water, plain.
24 glasses, cocktail, engraved with star.
20 glasses, Roman punch.
14 glasses, claret, engraved, Roman border.
35 glasses, burgundy, engraved, Roman border.
25 romers, engraved with border.
2 bowls, large, used with gilt plateau in state dining room.
24 dishes, bonbon, iridescent.
71 goblets, plain.
3 stands, cake, high.
3 dishes, berry, high.
12 dishes, celery, engraved vine border.
3 decanters, with handles.
4 vases.
11 saltcellars, individual.
12 goblets, engraved.

### CHINAWARE.

Lincoln set:
    11 plates, soup.
    56 plates, dinner.
    37 plates, breakfast.
    7 platters.
    6 platters, fish, red border with eagle in the center.
    1 plate, bread, red border with eagle in the center.
    4 pitchers.
    16 compotes.
    12 stands, cake.
    3 stands, pyramid.
    9 stands, fruit.
    2 bowls, punch.
    1 boat, gravy.
Grant set:
    10 plates, soup, yellow border.
    10 plates, soup, yellow borders, flowers.
    4 plates, dinner, flowers painted in center.
    5 stands, cake.
    6 stands, fruit.
    9 compotes.
    20 plates, soup, plain, yellow band.
    1 platter, fish.
    8 plates, soup.
    9 plates, soup, flower.
    13 plates, soup, small, yellow, with flowers.
    29 plates, dinner, painted in center.
    1 boat, gravy, yellow border.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

CHINAWARE—continued.

- Hayes set:
  - 31 plates, soup, decorated by Theo. Davis.
  - 59 plates, dinner, decorated by Theo. Davis.
  - 48 plates, oyster, decorated by Theo. Davis.
  - 32 plates, game, decorated by Theo. Davis.
  - 1 plate, game, broken.
  - 8 plates, fish, decorated.
  - 50 plates, cracker and cheese, decorated.
  - 36 plates, punch, decorated.
  - 70 plates, dessert, decorated.
  - 2 plates, salad, decorated.
  - 2 dishes, gravy boats, decorated.
  - 1 platter, fish.
  - 2 platters, game, ornamented with painting of canvas back duck.
  - 2 platters, meat, turkey decorations.
  - 2 platters, ice cream, ornamented with snowshoe.
  - 8 cups and saucers, coffee, odd shape.
  - 17 cups, coffee, after dinner.
- Arthur set:
  - 24 plates, dessert, odd.
  - 5 cups and saucers, Dresden, small.
  - 1 plate, dessert.
- Cleveland set:
  - 95 plates, dessert, turquoise.
  - 18 plates, dessert, ivory and gold.
  - 13 plates, dessert, odd plates.
  - 11 plates, dessert, scalloped edge, blue.
  - 84 plates, dinner, blue border.
  - 84 plates, dinner, red and gold.
  - 83 plates, dinner, pink and gold border.
  - 12 plates, dinner, pink and gold border.
  - 82 plates, breakfast, green and gold.
  - 14 plates, breakfast, green and gold.
  - 1 platter, ice cream, pink and gold.
  - 3 plates, ice cream, pink and gold.
  - 18 dishes, bon bon, flags of nation.
  - 393 plates, breakfast, rolled edge.
  - 191 cups, tea.
  - 190 saucers.
  - 190 cups, after dinner.
  - 193 saucers, after dinner.
  - 3 plates, Haviland, odd.
  - 84 plates, deep red, dinner.
  - 3 plates, rolled edge.
- Harrison set:
  - 8 plates, soup.
  - 88 plates, soup.
  - 85 plates, dinner.
  - 12 plates, dinner.
  - 70 plates, breakfast.
  - 12 plates, breakfast.
  - 56 plates, bread and butter.
  - 27 cups, after dinner.

CHINAWARE—continued.

- Harrison set—Continued.
  - 47 saucers, after dinner.
  - 3 plates, dinner.
  - 14 plates, breakfast.
  - 29 saucers, after dinner.
  - 8 cups, after dinner.
- McKinley set:
  - 24 plates, oyster.
  - 24 plates, dessert, rose border.
  - 12 plates, breakfast, green and gold border.
  - 12 plates, breakfast, green and gold border.
  - 12 plates, breakfast, blue and garland of roses.
  - 22 plates, butter, individual.
  - 5 cups, coffee, white and green.
  - 11 saucers, coffee, white and green.
  - 6 bowls, blue and white.
  - 2 pitchers, blue and white.
- 12 plates, soup, deep red border.
- 1 pitcher, small, blue.
- 1 ornament, China, hen on nest.
- 1 bowl, punch, high stand, blue and white.
- 6 ash receivers, shell, imitation.
- 24 ramakins, French china.
- 14 cups, tea, odd, Haviland.
- 18 saucers.
- 3 cups and saucers, coffee, green and gold border.
- 12 cups and saucers, coffee, green and gold border.
- 2 cups and saucers, large, colored bowl.
- 5 cups, tea, colored in bowl.
- 9 cups, coffee, after dinner.
- 1 plate, tea, deep red border.
- 1 plate, breakfast, deep red border.
- 1 plate, dinner, deep red border.
- 17 plates, soup, narrow yellow border.
- 1 plate, dinner, narrow yellow border.
- 5 plates, soup, wide red border.
- 18 cups, odd sizes.
- 41 saucers, odd sizes.
- 1 soup tureen.

LINEN.

- 1 tablecloth, 10½ yards long, embroidered "U. S."
- 2 tablecloths, 10½ yards long, embroidered "U. S."
- 1 tablecloth, 5 yards long.
- 1 tablecloth, 9 yards long.
- 1 tablecloth, 6½ yards long.
- 1 tablecloth, 5½ yards long.
- 2 tablecloths, 4 by 3 yards.
- 4 tablecloths, 7 yards long.
- 1 tablecloth, 4½ yards long.
- 1 tablecloth, 3 by 3 yards.
- 11 tablecloths, 3 by 3 yards, embroidered "U. S."
- 3 tablecloths, 4 yards long.
- 10 tablecloths, 2½ yards long (servants').

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### LINEN—continued.

7 tablecloths, 1½ yards long (servants').
23 tablecloths, 1¾ yards, cut down from long cloths.
26 covers, sideboard, hemstitched, embroidered "U. S.," old.
2 covers, sideboard, embroidered "U. S."
8 covers, sideboard, fringed.
33 napkins, fringed.
42 doilies, embroidered "U. S."
34 doilies, embroidered "U. S."
1 cloth, tray, hemstitched, embroidered "U. S."
53 napkins, 28½ by 36 inches.
57 napkins, large, embroidered "U. S."
15 napkins, large, embroidered "U. S." in red.
40 napkins, breakfast, embroidered "U. S."
2 table cloths.
58 napkins, poppy pattern, embroidered "U. S."
59 napkins, fern pattern, embroidered "U. S."
12 napkins, fancy border, embroidered "U. S."
59 napkins, flower border, embroidered "U. S."
177 napkins, ribbon border, embroidered "U. S."
17 doilies, Renaissance, open center.
1 centerpiece, Renaissance, open center.
12 doilies, large, German.
12 doilies, medium, German.
2 centerpieces, German.
1 centerpiece, 1¼ yards square, Renaissance.
2 centerpieces, embroidered, scalloped edges.
35 doilies, drawn work, small square embroidered in silk.
26 doilies, drawn work.
10 doilies, square, hemstitched in yellow silk.
8 doilies, scalloped edges, embroidered in silk.
11 doilies, large, plate, embroidered in colors.
10 doilies, aplique.
124 towels, glass, red and blue border.
79 towels, glass, red and blue border.
32 towels, kitchen, crash.
10 jackets, sweeping, white.
18 jackets, sweeping, white duck.
31 towels, roller, crash.
23 aprons, gingham.
14 aprons, denham.
24 aprons, linen, white.
9 pieces felt, table.
1 lot crash, floor, linen.
3 pieces felt, large.
19 sheets, linen, double.
69 sheets, linen, 3—4.

### LINEN—continued.

7 sheets, cotton, double.
51 sheets, cotton, 3–4.
26 pillow slips, wide, linen.
45 pillow slips, medium, linen.
48 pillow slips, medium, linen.
11 bolster cases, linen.
25 bedspreads, double.
7 bedspreads, 3–4.
32 bath towels, fringed.
23 bath towels, hemstitched.
48 towels, blue border, embroidered "U. S."
93 towels, white, hemstitched.
67 towels, blue border, embroidered "U. S."
48 towels, pink border, embroidered "U. S."
60 towels, red border, embroidered "U. S."
48 towels, gold border, embroidered "U. S."
24 towels, crash, servants', embroidered "U. S."
72 towels, crash, servants'.
40 towels, fringed, white, old.
6 towels, fringed, blue, old.
13 towels, fringed, red, old.
26 cloths, wash.
9 cloths, wash, hemstitched.
13 cloths, wash, fringed.
6 rugs, bath, dark brown.
46 doilies, Turkish.
30 scarfs, bureau, hemstitched.
4 scarfs, lined with blue.
3 doilies, lace.
12 covers, stand, edged with lace.
7 curtains, sash, dotted Swiss.
2 aprons, maids'.
17 pillow shams, ruffled.
1 pair pillow shams, lace.
2 pairs pillow shams, hemstitched and embroidered.
1 pair pillow shams, lace edge.
3 shams, sheet.
1 cover, table, lace edge.
1 cover, table, fringed.
52 blankets, single.
3 blankets, double.
5 quilts, silk.

### BASEMENT SOUTH BEDROOM.

32 yards matting, white China.
1 bed, double, maple.
2 mattresses, hair.
1 spring, woven wire.
1 bed, cot, wooden.
1 mattress, hair.
1 washstand, maple, marble top.
1 chest, cedar.
1 toilet set, 3 pieces.
1 table, small, ebonized.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### BASEMENT SOUTH BEDROOM—continued.

1 rack, towel, ash.
1 chair, wicker.
1 cushion for above chair.
40 yards carpet.
1 table, mahogany, long.

### HOUSEKEEPER'S ROOM.

40 yards carpet, Wilton.
32 yards matting, white, China.
1 shade, window, drab.
1 bed, folding, walnut.
1 mattress, hair.
3 pillows, feather.
1 bureau, walnut.
1 couch, walnut, upholstered.
1 desk, writing, walnut.
1 bookcase, walnut.
1 table, ebonized.
1 chiffonier, oak.
1 rocker, oak.
1 rocker, wicker.
1 chair, side, mahogany.
1 toilet set, 5 pieces.
2 figures, bronze, female.
1 footbath, tin.
1 basket, wicker, waste paper.
1 clock, walnut.

### COOK'S ROOM.

41 yards carpet, Wilton.
34 yards matting, white, China.
1 bed, iron.
1 mattress, hair.
1 spring, woven wire.
3 pillows, feather.
1 bed, folding, walnut.
1 mattress.
1 chair, arm, upholstered.
1 rocker, wicker.
1 chair, arm, high back, painted red.
1 rocker, cherry.
1 table, pine.
1 bureau, ash.
1 washstand, ash.
1 stand, typewriter, walnut.
3 comforters.
1 toilet set, 4 pieces.

### TWO ROOMS ADJOINING HALL WHERE GAS METERS ARE LOCATED.

1 sideboard, oak.
1 desk, oak.
2 chairs, wicker.
1 mirror, oak frame.
1 stand, shaving, mahogany.
1 chair, arm, high back, painted red.
1 washstand, ash.
1 toilet set, 3 pieces.

### BILLIARD ROOM.

1 carpet, Wilton, red.
2 shades, white Holland.
1 rack, hat, walnut.
1 chair, invalid's.
2 cushions for invalid's chair.
3 chairs, walnut, perforated seats.
1 set counters, string.
1 cuspidor, china.
1 chair, arm, walnut, upholstered in leather.
1 rack, walnut, for pool balls.
1 billiard table, Brunswick-Balke Co., combination.
1 set balls.
3 sets balls, straight billiard.
1 rack.
12 cues.
1 mace.
2 bridges.
1 stand, wash, walnut.
1 bowl and pitcher, white china.
1 brush for cleaning table.
3 bottles, leather.
2 bottles, leather.
1 fender, spark, wire.
1 pair andirons, brass.
1 fender, brass.
1 set rules, framed.
1 slop bowl, china.
6 chairs, side, upholstered.
1 settee, upholstered.
1 triangle, celluloid.

### SOUTHEAST BEDROOM.

48 yards carpet, Wilton.
48 yards matting, white, China.
3 shades, Holland, drab.
1 bed, iron.
1 mattress, hair.
2 pillows, feather.
1 stand, wash, walnut, inclosed.
1 chiffonier, oak.
1 stove, "Belle," No. 13.
1 stand, walnut.
1 rocker, cherry, cane seat.
2 chairs, splan seat.
1 mirror, walnut frame.
1 table, walnut.
1 scarf, table, plush, dark green.
1 bowl and pitcher, white, hotel china.

### LAUNDRY.

1 stove, heating irons.
4 tables, pine, large.
14 irons, flat, 6 and 7 pound.
2 boards, ironing.
1 board, bosom.
24 yards carpet, Wilton.
1 mirror in gilt frame.
1 wringer for clothes.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### LAUNDRY—continued.

1 wardrobe, maple.
3 washstands.
1 clock, nickel.

### SMALL BEDROOM NEXT TO LAUNDRY.

24 yards carpet, Wilton.
24 yards matting, white, China.
1 shade, white Holland.
1 bed, small, iron.
1 mattress, husk, cotton top.
1 pillow, feather.
1 dresser, rosewood.
1 wardrobe, walnut.
2 chairs, splan seat.
1 stand, wash, mahogany, marble top.
1 toilet set, 4 pieces.
1 cot, wooden.
1 hair mattress.
1 table, ebonized.

### STOREROOM (north side).

1 lot matting, white, China.
1 hamper, square, large.
1 bed, rosewood.
1 bed, walnut.
1 bed, iron.
1 screen, ebonized.
Ends for table used in state dining room.
1 cooler, water, porcelain lined.
3 doors, baize, used at receptions.
41 stands, music, iron, used by band.
75 chairs, wooden, used by band.
1 platform, wooden, used by leader of band.
1 mat, cocoa.
1 stove, self-feeding.
1 stove, Belle, No. 13.
12 coal hods, galvanized iron.
7 baskets, wood.
1 chair, barber's, walnut, upholstered.
12 table sections, used at state dinners.
16 trusses for table used at state dinners.
6 racks, skeleton, coat.
Boxes, coat.
Stands used in front of coat boxes.
Tags, brass, used at receptions.
8 table leaves, oak, belong to extension table.
3 lamps, used at receptions under canopies.
1 lot rods, iron, used for canopies.
1 wheelbarrow, iron, used in engine room.
2 pokers, long.
2 scrapers, long.
2 shovels, coal.
1 ax, short handle.
1 ax, long handle.
Lot of old awnings.
1 washer, clothes.
Lot of old carpet.
1 washstand, walnut.

### KITCHEN.

4 tables, pine.
29 pans, sauce, copper.
1 kettle, stock, copper.
2 boilers, fish, copper.
1 boiler, ham, copper.
1 bowl, beating, copper.
2 braiziers, copper.
1 sugar melter, copper.
9 molds, fancy, large jelly, copper.
19 molds, fancy, individual, biscuit, copper.
5 molds, plain, copper.
1 pan, melting, copper, for sugar.
7 pans, sauce, block tin.
4 molds, tin, fancy.
5 molds, brick, ice cream, tin.
9 molds, round, tin.
2 molds, melon, tin.
1 mortar, marble.
2 pestles for mortar.
1 rack, galvanized iron.
4 whips, wire.
24 molds, lead, individual, ice cream.
3 strainers, Chinese.
3 forks, iron, long.
1 block, meat, round.
1 block, meat, sectional.
1 chopper, meat, Enterprise.
2 boards, meat, oak.
1 box, tin, square, for salt and pepper.
4 molds, tin, jelly.
2 cleavers.
1 saw, meat.
5 ladles, soups and sauces.
71 molds, tin, individual, small.
16 molds, tin, individual, medium.
11 cutters, vegetable.
6 cutters, cake, fancy.
2 pans, drip, tin.
64 molds, block tin, small.
14 molds, block tin, medium.
23 molds, block tin, pyramid.
2 pastry cups, formers.
1 mold, tin, cone shape.
28 molds, flat, pear-shape, small.
11 cutters, pastry.
6 chairs, wooden.
1 chair, arm, painted red.
2 freezers, ice cream.
3 spoons, iron, long handle.
2 egg beaters, Dovers.
6 paddles, wooden.
8 spoons, wooden
22 cones, small.
1 coffee mill.
1 clock, 8-day, wooden.
1 pan, baking, patent, double.
3 baskets, frying, iron.
2 pots, porcelain lined.
1 pot, iron.
1 waffle iron.
4 molds, cake, tin, large, round.

*Inventory of public property in the Executive Mansion June 30, 1901*—Continued.

### KITCHEN—continued.

18 pans, drip.
1 steamer.
1 steamer, patented.
1 kettle, tea, iron.
3 cullenders, tin.
1 pan, bread.
1 boiler, double, agate ware.
2 crocks.
1 brush, wire.
3 dredgers, tin.
1 pick, ice.
10 bowls, yellow.
11 bowls, white.
2 pans, dish, tin.
8 pans, frying.
5 broilers, wire.
12 plates, pie.
3 pans, muffin, Russian iron.
8 pans, bread, Russian iron.
8 pans, roll, Russian iron.
9 cake tins, jelly.
1 grater, nutmeg.
2 strainers, wire.
3 strainers, Chinese.
1 knife, chopping.
1 bowl, chopping, wooden.
3 strainers, gravy, tin.
1 measure, quart, graduated.
1 box, knife, walnut.
1 funnel, tin.
1 grater, bread, tin.
2 cans, garbage, galvanized iron, large.
2 cans, garbage, galvanized iron, small.
1 pan, Bain Marie, to use on range.
3 servers, puree, tin frame.
1 tureen, soup, yellow ware.
9 cups, hotel china, white.
9 saucers, hotel china, white.
3 pitchers, milk.
1 pitcher, water.
4 dishes, baking, French.
6 dishes, vegetable, hotel china.
8 platters, hotel china.
3 plates, soup, hotel china.
2 plates, breakfast, hotel china.
3 knives, sabatier.
3 knives, hotel carvers.
2 forks, hotel.
1 knife, palette, long.
1 knife, sabatier, scollop.
2 openers, can, 1 nickel and 1 iron.
1 corkscrew, wooden handle.
1 scoop, potato.
1 steel.
1 coffeepot, 4 quart, tin.

### BASEMENT HALL.

1 table, pine, used in state dining room, covered with green baize.
1 scale, platform, Fairbanks, No. 11.
1 extinguisher, Babcock.
1 box, ice, "Ridgeway," oak.
200 feet hose, air, black rubber.
1 stand, mahogany, marble top.
Boxes, hat.
100 feet of hose.

### WATCHMEN'S LODGE IN GROUNDS.

1 carpet, Wilton, red.
1 stove.
1 metal board, enameled, to go under stove.
1 desk, walnut.
1 pail, galvanized iron.
4 chairs, splan seats.

### PRESIDENT'S STABLE.

1 stove, small, and pipe.
1 boiler, tin, for heating water.
2 chairs, wooden.
1 coal hod.
1 wash bowl.
1 pitcher.
1 coal shovel.

### STABLE OF PUBLIC BUILDINGS AND GROUNDS.

1 mare, bay.
1 wagon, Dayton, with top and two seats.
1 set harness, single.
1 set harness, single, Concord.
1 blanket, woolen, for street use.
1 blanket, stable.
1 blanket, rubber.
2 robes, light weight, for wagon.
1 robe, fur.

### IN STORAGE FOR FUTURE USE.

1 desk, walnut, carved ornaments.
1 settee, mahogany, upholstered in leather.
1 mirror, in gilt frame, formerly in blue parlor.
2 mirrors, in frame painted drab, formerly in private dining room.
2 sofas—1 frame, 1 upholstered.
2 carpets, from private stairs.

### CORCORAN ART GALLERY.

1 oil painting, "Love and Life."

## APPENDIX B.

### ADDRESS OF THEODORE A. BINGHAM, COLONEL, CORPS OF ENGINEERS, UNITED STATES ARMY, AT THE CENTENNIAL EXERCISES IN THE EAST ROOM, EXECUTIVE MANSION, WASHINGTON, D. C., DECEMBER 12, 1900.

> 'Tis not in mortals to command success;
> But we'll do more, Sempronius—we'll deserve it.
> (*Addison's Cato, act 1, scene 2.*)

MR. PRESIDENT, LADIES, AND GENTLEMEN:

In the spring of 1792 the commissioners of public buildings and grounds, under the immediate direction of the President, undertook the preparation of plans for the President's house. The house was occupied in November, 1800, although it was not then entirely completed. The room in which we now are was not finished; there was no north portico nor any graceful south portico, and the north door was approached by narrow wooden steps.

In December, 1900, the commissioner of public buildings and grounds presents to you a plan for enlarging the President's house.

In 1800 the population of the country was five and a quarter millions, and there was more than room enough in this house for all the purposes for which it was then required. In 1900 the population of the country has increased to seventy-six and a quarter millions, and it has long been practically impossible for this house to answer the purposes for which it is intended.

In the spring of 1897 I began to study the question of the enlargement of the present Executive Mansion with a view to satisfying myself as to whether it should be enlarged; and if so, how? As I became familiar with the daily life of a President the conclusion was forcibly presented to my mind that he would be more comfortable, both in his private and official life, if both office and home were under one roof. How, then, could an extension of this house be best accomplished since there is sufficient ground for the purpose? Five guiding principles were adopted as necessary to be followed in any design for an extension, not only on account of their own propriety, but also to meet the wishes of the great majority of the American people. These were—

1. The present Executive Mansion to remain absolutely unchanged, and, if possible, not an outer door or window to be closed up.
2. The additions to be of such a character as not to dwarf or obscure the present Mansion; rather, if possible, to accentuate it.
3. Architectural harmony to be absolutely preserved.
4. The additions to be such as to relieve the pressure upon the present building for, say, twenty-five or thirty years, and permit of still further extension in the future as may be found necessary, while at the same time presenting the appearance of a finished building.
5. Reasonable expenditure.

Of all the records I was able to find of extensions which had been proposed in the past to the Executive Mansion that prepared under the supervision of the late Mrs. Harrison came nearest to fulfilling the required conditions as just stated. This plan, as many of you doubtless know, consisted, in a word, of buildings about the size of the present house, one on the east side and one on the west side of the White House grounds, connected to the present Mansion by curved wings, the quadrangle being completed by rebuilding the conservatories at the south end of the grounds. Perhaps the most striking advantage of this plan is that it quite maintains the present openness to sun and air toward the south and southwest—a vital necessity—and preserves the beautiful view to the south as unobstructed as it is to-day.

Such a quadrangular plan of course involves a large expenditure for its completion, but it seemed worthy of adoption in general outline.

One of the conditions by which I limited myself being reasonable expenditure, which I assumed at about one million dollars, study was then made of the question, "How much of Mrs. Harrison's plan could be completed for that sum?" It was found that the two wings—one on the east side and one on the west side—could probably be built, though in the completed plan these wings were intended rather as connecting passages than for daily occupancy.

Study was next given to the question, "Could these wings be utilized until such time as further addition should be made and the wings revert to their intended use?" A satisfactory solution, it is thought, was reached.

It then became necessary to have these studies worked out. For this work I naturally turned to Mr. Frederick D. Owen, the architect who had shaped up Mrs. Harrison's plans and who was already familiar with the limitations which surrounded this question of extending the Executive Mansion. The results of our studies are presented to you to-day in part. In the short time which has passed since the 1st of last July it has only been possible to complete what you see before you. Much other work has been done in the study of details, as, for instance, the interior finish and decoration, interior steel construction, fireproofing, heating, ventilating, refrigerating, etc.

The plan presented to you complies with the five limiting conditions laid down at the outset. As you will observe, the present Mansion is left unchanged; not an outer door or window of a room is closed, the extensions beginning on the prolongations of the main corridors.

Architectural harmony has been preserved. The main columns used are enriched by fluting, but this is a detail which could be changed. The same windows and casings have been carried on in the proposed additions. Owing to the recession of the extensions to the rear, the present building is not obscured nor dwarfed. As to the extensions themselves, every shape that could be thought of has been drawn out and studied, with the result that what you see before you is regarded as the best. The vista which the two extensions present from New York avenue and Pennsylvania avenue is fine and in harmony with the present front view of the Mansion.

Careful study was given to the question as to whether the extension adjoining the present Mansion should be of one story or two. This question was complicated by the necessity for having living rooms on the second story, under the conditions imposed of a limited expenditure, yet providing for all demands made upon the house. It is not impossible that a two-storied extension was originally intended by Hoban, the architect and builder; for, you will remember, this house was originally intended to be one story higher, and you can still see at each end, just above the arched windows of the second story, a horizontal panel across the frieze and architrave, left, as I suppose, for the extension joint. Considering that the necessities of the case required the extension in two stories, it is submitted that the resulting design is not displeasing.

The necessity for using the second story for living purposes also complicated very much the construction and design of the large circular room on the main floor, but the solution presented will, it is believed, prove satisfactory when all the circumstances are considered.

It is proposed to build the basement of granite, the walls of concrete and marble, inclosing a steel framework. At the west end the large room would be suitable for a state dining room, capable of seating more than two hundred guests. That end of the building has been studied with that purpose in view, having proper provision for kitchen, serving rooms, pantries, etc., in the basement. Provision has also been made at both east and west ends for the reception of large companies of guests, with necessary arrangements in the way of dressing rooms and wardrobes. The large room at the east end is intended as a reception room additional to the present East Room.

On the second story, at the west end, six bedrooms are provided en suite, with four bath rooms in connection therewith. At the extreme southwest end is a very bright, cheerful room, which might be utilized as a boudoir. At the east end of the second story are six additional rooms, intended for executive offices, provided with necessary storerooms for records, stationery, etc., and with toilet and wash rooms; and at the extreme southeast end there is a room available for visitors, newspaper men, or other similar needs. Two additional entrances are provided, one more private than the present one and the other more convenient for official use.

It is intended to heat both additions by air warmed by passing over hot-water coils, and to ventilate, heat, and cool the extensions mechanically. Provision has been made throughout both extensions for ducts for the necessary pipes, wires, etc. Lighting is to be electric, and electric elevators are also provided in both extensions.

Although not entirely satisfied with what is offered for your inspection to-day, owing to the difficulty of using these extensions mainly for living purposes instead of as corridors, I still feel a reasonable confidence that examination of the details and explanation of the reasons for their adoption will produce increased satisfaction with the plans proposed. Should either of the larger additions included in Mrs. Harrison's plans ever be added to these extensions, many of the imperfections of the present plan due to lack of space would be removed.

Careful but *not final* estimates on the extensions proposed amount to eleven hundred thousand dollars, including partial furnishing. Should the work be undertaken, however, I think, from past experience, that this estimate is quite sufficient.

In the necessarily short time at my disposal to-day for showing you these plans it is of course impossible to do more than describe the main features.

The history of this house as it grew, year by year, is very interesting. It was a delightful study to trace up the source of Hoban's inspiration and see how, point by point, he had improved on his first idea.

The period of its rebuilding after 1814 up to its final completion in 1829 under Hoban's own eye only increases one's admiration for its architectural beauties and for its designer and builder. But for this there is at present no time.

Before closing I wish particularly to thank Mr. Owen for enthusiasm, energy, and untiring devotion to the work during the past three years, and particularly in the rapid preparation of this exhibit. The modeler should also not be forgotten, who, with every desire to produce artistic work, was much hampered by lack of time in completing some of the details to his own satisfaction.

We have endeavored to imbue ourselves with a part, at least, of the spirit of the first architect of this house, and have worked for the entire country; and if these results please you, its representatives, *that* is our sufficient reward.

## APPENDIX C.

### PROGRAMME OF COMPETITION FOR THE GRANT STATUE OR MEMORIAL, WASHINGTON, D.C.

[Models to be submitted between March 1 and April 1, 1902.]

### COMMISSION.

Gen. G. M. DODGE, *President of the Society of the Army of the Tennessee, Chairman.*
Hon. GEORGE PEABODY WETMORE, *Chairman of the Joint Committee on the Library, U. S. Senate.*
Hon. ELIHU ROOT, *Secretary of War.*
Mr. M. O. CHANCE, *Secretary.*
Col. T. A. BINGHAM, U. S. A., *Executive and Disbursing Officer.*

GRANT STATUE OR MEMORIAL COMMISSION,
WAR DEPARTMENT,
*Washington, D. C., April 10, 1901.*

The commission authorized by act of Congress, approved February 23, 1901, to select the site and receive plans, designs, and models for a statue or memorial of Gen. Ulysses S. Grant, late President of the United States and General of the Armies thereof, invite artists who are citizens of the United States to submit models for such statue or memorial by April 1, 1902, under the following conditions:

Artists competing must send, at their own expense and risk, to the officer in charge of public buildings and grounds, War Department, Washington, D. C., between March 1 and April 1, 1902, accurate and detailed models of their design on the scale of 1 inch to the foot. These models must include a design for the statue or memorial complete above the foundation.

Artists desiring to submit models for the competition must, on or before the 1st day of January, 1902, notify the officer in charge of public buildings and grounds, at the War Department, Washington, D. C., of their intention to submit models, with a statement of the superficial area which will be occupied by such model when set up ready for inspection and comparison. No person other than those giving such notice will be permitted to enter the competition.

The cost of the statue or memorial is limited by law to $250,000, including the entire expense of excavation, foundation, pedestal, the statue or memorial, and all expenses incidental to the erection of the statue or memorial, ready for unveiling.

A full description of the model must accompany it, giving exact dimensions, kind and character of the material to be used, and a detailed estimate of the cost, with the full name of the artists.

Models submitted, the enlargement of which can not in the judgment of the commission be erected of first-class material and in a first-class manner for the sum of $240,000 will not be considered.

Artists must submit with the models a plan for the improvement of the grounds upon which the statue or memorial is to be located, said plans showing their relation to the completed work, but the cost of the improvement of the grounds is not to be included in the cost of the statue or memorial.

All statue work and bronze casting must be executed in the United States.

The statue or memorial itself must represent the character and individuality of the subject. All models must be in plaster. No drawings without models will be accepted.

Only such sculptors, artists, or architects as are not connected in a business way with any monumental firm or bronze foundry will be allowed to take part in the competition.

All models will be exhibited for two weeks prior to rendering of final decision.

All models will be held for delivery to or upon the orders of the artists for two weeks after notice of final decision. After the expiration of that period the commission will be at liberty to cause them to be destroyed. Each competitor shall at the time of entering into the competition give the officer in charge of public buildings and grounds his full name and address, and notices mailed to him at the address so stated shall be deemed sufficient.

Attention is particularly called to the following clause of the law:

"One of which plans, specifications, or models shall, if deemed sufficiently meritorious by the commission, be selected, or the commission may select any part of any of the plans, specifications, or models that it may elect and that it can use."

The commission reserves the right to reject any or all designs and models.

Subject to the foregoing provisions, the commission will first select, from all the models submitted, six which they consider the most meritorious, and will pay to each of the six artists submitting the models thus selected $1,000. The final selection will be made from the six thus chosen.

No extension of time will be given any artist. No model received after April 1, 1902, will be considered in the competition unless it is shown that it was started in time to reach its destination in the ordinary course of transportation, and the delay was caused by reasons beyond the control of the artist.

The models, designs, and plans accepted by the commission for the statue or memorial will, in the discretion of the commission, upon acceptance, become the property of the United States.

The statue or memorial is to be located in the tract of ground known as the White Lot or the President's Park, either on the line of the south axis of the State, War, and Navy building, in a plot described as follows: "A parcel of land bounded on the west by Seventeenth street; on the north by the roadway to the south of the State, War, and Navy building; on the south by the south building line of D street, if extended; and on the east by the existing park roadways to the southwest of the White House grounds and the northwest of the oval; or on a plot of land forming part of the oval, on the northerly side thereof, on the south axis of the White House and north of the south building line of D street, if extended."

The selection of the site will be one of the elements to be considered in the competition. All designs for the site last mentioned must be of such a character as to be subordinate to the White House itself and the other features of the landscape at present existing. Designs may be submitted for either site or for both.

A copy of the law under which the commission acts and a plat of the ground are annexed to this circular for the information of the competitors.

As soon as practicable after the selection of the models the commission will report its action to Congress.

All letters of inquiry and other communications should be addressed to the Secretary of the Grant Statute or Memorial Commission, War Department, Washington, D C.

Commission

GRENVILLE M. DODGE,
*President Society of the Army of the Tennessee, Chairman.*
GEO. PEABODY WETMORE,
*Chairman Joint Committee on the Library, U. S Senate.*
ELIHU ROOT,
*Secretary of War.*

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[PUBLIC—No. 84.]

An act for the preparation of plans or designs for a memorial or statue of General Ulysses S. Grant on ground belonging to the United States Government in the city of Washington, District of Columbia.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the president of the Society of the Army of the Tennessee, the chairman of the Joint Committee on the Library, and the Secretary of War be, and they are hereby, created a commission to select a site and secure plans and designs for a statue or memorial of General Ulysses S. Grant, late President of the United States and General of the Armies thereof, said statue not to cost in excess of the sum of two hundred and fifty thousand dollars.

SEC. 2. That said commission is authorized to select any unoccupied square or reservation belonging to the Government, or part thereof, in the District of Columbia, except the grounds of the Capitol and Library of Congress, on which to erect the said statue.

SEC. 3. That the said commission is authorized and required to advertise for plans, specifications, and models for the base, pedestal, and statue provided for in section one, and may pay to competing artists for the same, and for expenses incident to making such selection, a sum not exceeding ten thousand dollars, which sum is hereby appropriated out of any money in the Treasury not otherwise appropriated, one of which plans, specifications, or models shall, if deemed sufficiently meritorious by the commission, be selected, or the commission may select any part of any of the plans, specifications, or models that it may elect and that it can use.

SEC. 4. That as soon as practicable after the selection authorized by section three is made, said commission shall report their action to the Congress of the United States.

Approved February 23, 1901.

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## APPENDIX D.

### PROGRAMME OF COMPETITION FOR THE EQUESTRIAN STATUE OF THE LATE MAJ. GEN. GEORGE B. M'CLELLAN, WASHINGTON, D. C.

[Models to be submitted between April 1 and May 1, 1902.]

### COMMISSION.

Hon. ELIHU ROOT, *Secretary of War, Chairman.*

Hon. GEORGE PEABODY WETMORE, *Chairman of the Joint Committee on the Library, U. S. Senate.*

Brig. Gen. GEORGE D. RUGGLES, U. S. A., *Chairman of the McClellan Statue Committee of the Society of the Army of the Potomac.*

Mr. M. O. CHANCE, *Secretary.*

Col. T. A. BINGHAM, U. S. A., *Executive and Disbursing Officer.*

MCCLELLAN STATUE COMMISSION, WAR DEPARTMENT,
*Washington, D. C., May 3, 1901.*

The chairman of the Joint Committee on the Library, the Secretary of War, and the chairman of the McClellan statue committee of the Society of the Army of the Potomac, acting under the provisions of the act of Congress approved March 3, 1901, for the selection and preparation of a site and the erection of a pedestal and the completion of a statue of the late Maj. Gen. George B. McClellan, and the said chairman of the McClellan statue committee of the Society of the Army of the Potomac also acting as the specially authorized representative of the said McClellan statue committee, all of whom are hereinafter designated as the commission, invite artists, who are citizens of the United States, to submit models for such pedestal and equestrian statue by May 1, 1902, under the following conditions:

All artists competing must send, at their own expense and risk, to the officer in charge of public buildings and grounds, War Department, Washington, D. C., between April 1 and May 1, 1902, accurate and detailed models of their designs on the scale of 2 inches to the foot. These models must include a design for the statue and pedestal, complete above the foundation.

All artists desiring to submit models for the competition must, on or before the 1st day of February, 1902, notify the officer in charge of public buildings and grounds, at the War Department, Washington, D. C., of their intention to submit models, with a statement of the superficial area which will be occupied by such model when set up ready for inspection and comparison. No persons other than those giving such notice will be permitted to enter the competition.

The cost of the statue and pedestal is limited to $60,000, including excavation, foundation, and all expenses incidental to the erection of the statue and pedestal.

Models submitted, the enlargement of which can not, in the judgment of the commission, be erected of first-class material and in a first-class manner for the sum of $50,000, will not be considered.

A full description of each model must accompany it, giving exact dimensions, kind and character of the material to be used, and a detailed estimate of the cost, with the full name of the artist.

The statue itself must represent the character and individuality of the subject. All models must be in plaster; no drawings without models will be accepted.

Only such sculptors, artists, or architects as are not connected in a business way with any monumental firm or bronze foundry will be allowed to take part in the competition.

All models will be exhibited for two weeks prior to rendering of final decision.

All models will be held for delivery to, or upon orders of, the artists for two weeks after notice of final decision. After the expiration of that period the commission will be at liberty to cause them to be destroyed. Each competitor shall at the time of entering into the competition give the officer in charge of public buildings and grounds his full name and address, and notices mailed to him at the address so stated shall be deemed sufficient.

The commission reserves the right to reject any or all designs and models.

Subject to the foregoing provisions, the commission will first select, from all the models submitted, four which they consider the most meritorious, and will pay to each of the four artists submitting the models thus selected $500. The final selection will be made from the four thus chosen.

No extension of time will be given any artist. No model received after May 1, 1902, will be considered in the competition unless it is shown that it was started in time to reach its destination in the ordinary course of transportation, and the delay was caused by reasons beyond the control of the artist.

The models, designs, and plans accepted by the commission for the statue and pedestal will, in the discretion of the commission, upon acceptance, become the property of the United States.

All letters of inquiry and other communications should by addressed to the secretary of the McClellan statue commission, War Department, Washington, D. C.

Commission
ELIHU ROOT,
*Secretary of War.*
GEO. PEABODY WETMORE,
*Chairman Joint Committee on the Library, U. S. Senate.*
GEO. D. RUGGLES,
*Brig. Gen., U. S. A.,*
*Chairman of the McClellan Statue Committee,*
*Society of the Army of the Potomac.*

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## INDEX.

A. Public buildings:

Page.
1. Executive Mansion .......... 3690
    Care, repair, and refurnishing .......... 3690
    Painting .......... 3690
    Electric work, lighting, and plumbing .......... 3690
    Telephone and fire alarm systems .......... 3691
    Official social functions .......... 3691
    Basement .......... 3691
    East room .......... 3691
    Southeast or green parlor .......... 3691
    Southwest or red parlor .......... 3692
    State dining room .......... 3692
    Private dining room .......... 3692
    Anteroom, first floor .......... 3692
    Corridor, first floor .......... 3692
    Northwest bedroom .......... 3692
    Northwest dressing room .......... 3692
    Southwest bedroom (green) .......... 3692
    Southwest dressing room .......... 3692
    Southwest bathroom .......... 3692
    Corridor, second floor .......... 3692
    Executive office rooms (east end) .......... 3693
2. Extension of Executive Mansion .......... 3693
3. Executive Mansion greenhouses .......... 3694
4. Executive Mansion conservatory .......... 3694
5. Executive Mansion stables .......... 3695
6. Stables, office public buildings and grounds .......... 3695
7. House where Abraham Lincoln died .......... 3695
8. Other buildings .......... 3696

B. Washington Monument: Page.

1. General report 3696-3698
2. Levels 3698
3. Electric elevator 3698, 3699
4. Distribution of weights 3699
5. Data 3700

C. Public reservations in the District of Columbia:

1. General remarks 3700, 3701
2. Classification of work 3700
3. Marking stones 3701
4. Park curbing 3702
5. Park watchmen 3702
6. Children's playgrounds 3702, 3703
7. Grounds of Executive Mansion 3703, 3704
   Damage by inaugural committee 3703, 3704
8. Reservations improved to first stage during the year 3701
   Table and map 3701
9. Northwest division 3704-3707
10. Southwest division 3707-3709
11. East division 3709, 3710
12. Table of data relating to principal city parks in United States 3711-3714
13. Inaugural occupation of parks 3715
14. Propagating gardens, greenhouses, and nursery 3715
    (a) General remarks 3715-3718
    (b) New storehouse 3718
    (c) New shops 3718, 3719
15. Parsons's plan for improving the Mall 3719

D. Statues 3719-3721
E. Miscellaneous 3721, 3722
F. Lighting the public parks 3722
G. Asphalt pavements 3723
H. Departmental telegraph 3723, 3724
I. Old records of Washington city 3724, 3725
K. Building extensions in Washington 3725
L. Reservations occupied contrary to law 3725, 3726
M. Monument at Wakefield, Va 3726, 3727
N. United States wharf in Washington 3727, 3728
O. Summary 3728-3730
P. List of stock propagated, purchased, and presented 3730, 3731
Q. Estimates 3731-3735
R. Financial statement 3735

PHOTOGRAPHS.

1. New office, propagating garden 3716

MAPS.

1. Reservations improved, 1900-1901 3701
2. Proposed development of propagating gardens 3718
3. L'Enfant's plan for the Mall, 1791 3719
4. First study for realization of same 3719
5. Second study for realization of same 3719
6. Study for improvement of Potomac Park in connection with proposed Memorial Bridge, the Monument grounds, and the Mall 3719

# APPENDIX E E E.

## NORTHERN AND NORTHWESTERN LAKES—CORRECTING AND ISSUING CHARTS—SURVEYS—WATER LEVELS.

### *REPORT OF MAJ. WALTER L. FISK, CORPS OF ENGINEERS, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

### E E E 1.

United States Engineer Office,
*Detroit, Mich., July 27, 1901.*

General: I have the honor to submit herewith annual report on survey of the Northern and Northwestern Lakes for the fiscal year ending June 30, 1901. This work was transferred to me by Col. G. J. Lydecker, Corps of Engineers, January 18, 1901.

Very respectfully, your obedient servant,

W. L. Fisk,
*Major, Corps of Engineers.*

Brig. Gen. G. L. Gillespie,
*Chief of Engineers, U. S. A.*

## NORTHERN AND NORTHWESTERN LAKES—CORRECTING AND ISSUING CHARTS—SURVEYS—WATER LEVELS.

As early as 1817 local surveys of the Great Lakes for special purposes were made by Engineer Officers; but the Survey of the Northern and Northwestern Lakes, as a connected and systematic whole, was commenced in 1841 and prosecuted continuously until 1882, when work was suspended, as the data then in hand seemed sufficient for the requirements of navigation of the period. After the suspension and until 1889 operations were limited to the publication and issue of charts, $2,000 or $3,000 being appropriated annually for this work. In 1889 field operations were resumed under an appropriation made therefor and have been continued, under annual appropriations ranging from $5,000 to $25,000. In 1898 these operations were extended to include observations and investigations of lake levels, with a view to ascertaining the causes of changes in level, determining the hydraulic data needed for formulating the laws of interlake flow, and devising the most feasible method of lake-level maintenance or regulation, and the appropriations in 1900 and 1901 were increased to $75,000 and $100,000, respectively.

Operations during the last fiscal year have included work related to the several features above referred to, as follows:

*Charts.*—The following statement shows the number received and disposed of at this office:

| Description. | Number. | Total. |
|---|---|---|
| On hand July 1, 1900 | 5,464 | |
| Received during the year | 10,610 | |
| Total on hand and received | | 16,07 |
| Sold at 31 cents each | 34 | |
| Sold at 30½ cents each | 25 | |
| Sold at 30 cents each | 91 | |
| Sold at 27 cents each | 330 | |
| Sold at 26½ cents each | 141 | |
| Sold at 25 cents each | 55 | |
| Sold at 24 cents each | 378 | |
| Sold at 23½ cents each | 98 | |
| Sold at 23 cents each | 823 | |
| Sold at 20 cents each | 4,721 | |
| Sold at 11 cents each | 29 | |
| Sold at 10 cents each | 25 | |
| Sold at 8 cents each | 7 | |
| Sold at 7 cents each | 32 | |
| Sold at 6¼ cents each | 2 | |
| Sold at 5 cents each | 70 | |
| | 6,861 | |
| Issued to United States vessels and for official use | 1,404 | |
| Destroyed, worthless, not having corrections to date | 995 | |
| Total disposed of | | 9,26 |
| On hand July 1, 1901 | | 6,8 |

The total number of charts sold during the year was 6,861, the total amount received from these sales being $1,445.49, which was duly deposited to the credit of the Treasurer of the United States. The total number of charts that have been sold and issued through this office to June 30, 1901, is 240,241.

Extensive corrections and additions were made to old charts in this office during the year, as follows:

Lake Superior No. 1.
Lake Superior No. 2.
Lake Superior No. 3.
Ontonagon Harbor, Lake Superior.
Copper Harbor, Lake Superior.
Portage Lake and River, Lake Superior.
L'Anse and Keweenaw Bay, Lake Superior.
Grand Island, Lake Superior.
Straits of Mackinac.
North end of Lake Michigan.
Beaver Island group, Lake Michigan.
North end of Green Bay.
South end of Green Bay.
Coast chart No. 1, Lake Michigan.
Coast chart No. 2, Lake Michigan.
Coast chart No. 3, Lake Michigan.
Coast chart No. 4, Lake Michigan.
Coast chart No. 5, Lake Michigan.
Coast chart No. 6, Lake Michigan.
Coast chart No. 7, Lake Michigan.
Coast chart No. 8, Lake Michigan.
Coast chart No. 9, Lake Michigan.
Grand and Little Traverse bays, Lake Michigan.
Lake Huron.
St. Clair River.
Detroit River.
Lake Erie.
Coast chart No. 1, Lake Erie.
Coast chart No. 2, Lake Erie.
Coast chart No. 3, Lake Erie.
Coast chart No. 4, Lake Erie.
Coast chart No. 5, Lake Erie.
Coast chart No. 6, Lake Erie.
Sandusky Bay.
Coast chart No. 1, Lake Ontario.
St. Lawrence River No. 5.
St. Lawrence River No. 6.

These corrections and additions included changes in aids to navigation, modifications due to river and harbor improvements, latest magnetic determinations, additional and corrected sailing courses, and the most prominent topographic or hydrographic changes developed by commercial and industrial enterprise on the shores of the lakes and their tributary and connecting rivers. Much office work was applied to incidental changes of individual charts by hand, preparatory to sale or issue, in cases where the last edition as printed did not supply the latest authentic information.

In addition to correcting old charts new ones were prepared and issued, as follows:

1. Lake Front, Chicago, Ill., including Calumet Harbor (in colors). Drawing, scale 1: 24000, photolithographed and printed on scale of 1: 30000.
2. Buffalo Harbor and Niagara River to the Falls (in colors). Drawing, scale 1: 25000, photolithographed and printed in this office on scale of 1: 30000.
3. Dunkirk Harbor, New York (in colors). Drawing, scale 1: 6000, photolithographed and printed on scale of 1: 8000.
4. Erie Harbor and Presque Isle, Pennsylvania (in colors). Drawing, scale 1: 10000, photolithographed and printed in this office on scale of 1: 15000.
5. Agate and Burlington bays, Minnesota (in colors). Scale 1: 6000, the first of the charts engraved directly on stone.
6. Sturgeon Bay, Canal, and Harbor of Refuge (in colors). Scale 1: 25000, the second of the charts engraved directly on stone, and the entire work, including printing, done in this office.
7. Shoal at head of Russell Island, St. Clair River. Small sketch, scale 1: 10000, engraved on stone and printed for free distribution.

Prepared, but not yet issued:

1. Apostle Island No. 2. Drawing, scale 1: 40000, completed and held awaiting data from survey now in progress.

Prepared and just ready for issue (will be out by August 15):

1. Maumee Bay and Maumee River, including city of Toledo, Ohio. Scale 1: 25000, engraved on stone and will be printed in colors in this office.
2. Harbor at Duluth, Minn., and Superior, Wis. Scale 1: 18000, engraved on stone and will be printed in colors.
3. Cleveland Harbor, Ohio. Drawing, scale 1: 10000; will be photolithographed on scale 1: 15000 and printed in colors.

Charts well under way:

1. Muskegon Harbor, Lake Michigan, including Muskegon Lake. Scale 1: 15000, engraved on stone.
2. Ashtabula Harbor, Ohio. Scale 1: 5000, engraved on stone.
3. Milwaukee Harbor, Wisconsin. Drawing, scale 1: 10000, to be photolithographed to scale 1: 15000.

Reductions are in progress for the following:

1. New chart of Lake Huron, including Georgian Bay. Scale 1: 400000, to be engraved on stone.
2. Conneaut Harbor, Ohio. Scale 1: 5000, to be engraved on stone.
3. Fairport Harbor, Ohio. Scale 1: 8000, to be engraved on stone.
4. Marquette Harbor, including Presque Isle and Middle Island. Scale probably 1: 15000, to be engraved on stone.

Experiments have been in progress during the last half of the year with a view to developing a cheaper and more rapid method of getting out charts than by ordinary photolithography. The method under trial has been to engrave the original directly upon the lithograph stone on the scale desired for publication, instead of making the original a drawing on paper on an enlarged scale for reduction and reproduction by photolithography on the desired publication scale.

The new method, so far as tried, seems to possess many advantages over the old, some of which are as follows:

The fine lines of the chart, upon which its appearance so greatly depends, are preserved in a manner practically equal to the best copperplate work, while they are more or less blurred in the best photolithograph work.

The cost of engraving the stone original is less than that of preparing a paper original which will reproduce properly. The charts are far more accurate in scale than copperplate or photolithograph work.

Corrections and additions can be better and more easily made on the stone than on paper original.

The reduction by photography is entirely eliminated, a saving in both accuracy and expense of issue.

There are also minor advantages in the method which it is unnecesary to mention, as the foregoing are believed to furnish ample reason for further experiment in this line.

Numerous grades of paper are being tried with a view to finding something that will wear better than that ordinarily used in lithograph work, and the colors used on the charts are likewise not yet regarded as standard.

The reduction, preparation, and reproduction of charts in this office has continued, as heretofore, under the immediate supervision and direction of Mr. Edward Molitor, and the trial of the new method is at his suggestion.

The new charts are all printed in colors, and the substitution of such charts for those formerly issued continues to be highly satisfactory to vessel masters, for they show at a glance the characteristic depths of water areas as respects safe or unsafe navigation for vessels of light or deep draft. It is desirable that all charts issued be of this character and that the changes be brought about as rapidly as practicable.

*Surveys.*—The approved project for the expenditure of available funds includes a resurvey of the vicinity of the Apostle Islands, Lake Superior; resurvey of the northern end of Lake Michigan, and of the Straits of Mackinac; sufficient work to bring the St. Lawrence River charts up to date, to be done by the party making discharge measurements of the St. Lawrence River; completion of the St. Clair River resurvey and a partial resurvey of Detroit River to bring charts up to date, this work to be done by the party making discharge measurements of Detroit River; also a precise-level party to connect Lake Erie at Buffalo with Lake Ontario at Olcott, N. Y., extend precise levels from Fort Gratiot lighthouse to Lexington, on Lake Huron, and then rerun the unsatisfactory level line connecting Lake Huron at Detour with Lake Superior at Point Iroquois.

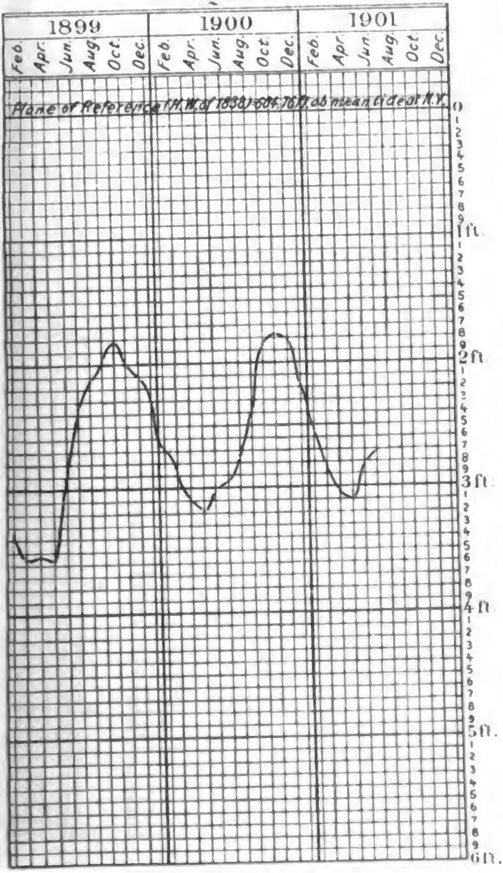
The precise-level party was organized with little difficulty and took the field under charge of Mr. W. S. Williams May 7, having been delayed a few days because the utter failure of a prominent firm in attempting to regraduate the Lake Survey precise-level rods rendered it necessary to borrow a set from the Mississippi River Commission. The party was at Buffalo and upon receipt of the borrowed rods, May 9, at once commenced work on the Buffalo-Olcott line, completing it June 22, having in that time run in duplicate 50.01 miles of main line and 5.55 miles of side lines to connect with various bench marks and gauges. The party was then transferred to Port Huron, Mich., for the Fort Gratiot-Lexington work, arriving there June 23, and on June 30 had completed, in duplicate, 5.6 miles of this line.

The Apostle Islands party, in charge of Mr. F. G. Ray, was a much more difficult organization to complete satisfactorily in the minor positions and took the field somewhat short of men on May 28, as early as settled weather could be expected in that locality.

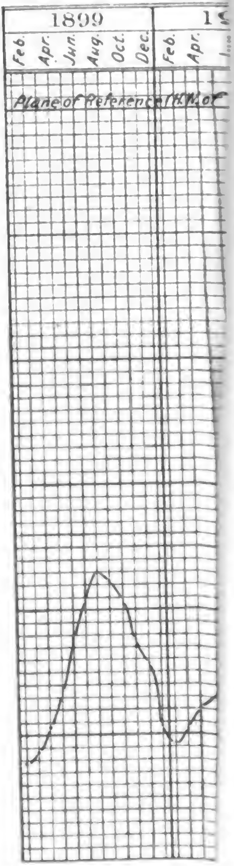
The party is now about complete and has made very satisfactory progress with the help of the steamer *Vidette*, kindly loaned for this work from the Duluth district.

SURVE

## LAKE SUPERIOR.
MARQUETTE.



## LAKE M
MILWA



THE NORRIS PETERS CO. PHOTO-LITHO. WASHINGTON, D. C.

The party for northern Lake Michigan, in charge of Assistant Engineer L. C. Sabin, with the U. S. steamer *Search*, began on the continuation of the St. Clair River survey May 17 and continued on this work until June 5, when, the season being sufficiently advanced, the boat and party were sent to Lake Michigan to take up the season's work, beginning with a development of South Fox Island shoal, which is now well under way.

A few small surveys have been made to develop shoals to obtain missing data for charts in hand and to verify information which has been gathered from many different sources by correspondence, conversation, and otherwise.

Magnetic observations were taken at Au Sable and Harbor Beach, Mich., on west shore of Lake Huron, and at the same time the wreck of the steamer *Baltimore* was also accurately located. Its position was published in Associated Press dispatches.

Much difficulty has been experienced and time lost in all localities in finding the old lake survey stations.

*Water levels.*—The stage of water in Lakes Huron, Michigan, and Superior, in Green Bay and in the St. Marys River above the Falls, have been recorded, as heretofore, by gauge readings made at Sand Beach, Milwaukee, Marquette, Escanaba, and Sault Ste. Marie, respectively. The following table shows the monthly means for the year derived from these records:

*Monthly means of water level for stations named, expressed in feet, below the plane of reference adopted in 1876.*

| Station. | 1900. | | | | | | 1901. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May. | June. |
| Sand Beach | 4.23 | 4.14 | 4.06 | 4.12 | 4.12 | 4.32 | 4.56 | 4.70 | 4.71 | 4.24 | 4.03 | 3.93 |
| Milwaukee | 4.22 | 4.05 | 4.10 | 4.09 | 4.23 | 4.56 | 4.80 | 4.83 | 4.41 | 4.26 | 3.83 | 3.78 |
| Escanaba | 4.37 | 4.14 | 4.22 | 4.21 | 4.47 | 4.62 | 5.03 | 4.89 | 4.76 | 4.36 | 4.08 | 3.89 |
| Marquette | 2.74 | 2.38 | 1.86 | 1.78 | 1.81 | 2.19 | 2.54 | 2.84 | 3.04 | 3.10 | 2.81 | 2.71 |
| Sault Ste. Marie | 2.72 | 2.52 | 2.03 | 1.91 | 1.88 | 2.27 | 2.67 | 2.94 | 3.19 | 3.05 | 2.72 | 2.72 |

The accompanying plats illustrate the varying stages of water as shown by like records for the last three years.

*Investigation of lake levels.*—The general project for this investigation is printed in the Report of the Chief of Engineers for 1898, pages 3774–3776, and operations to June 30, 1900, are outlined in the report for that year, page 5319 et seq.

Discharge observations were continued on St. Clair River near Port Huron throughout the year, bringing out some very interesting developments regarding the effect of ice in impounding the water, the discharge of the St. Clair River being cut down to about one-half that for the same stage with no ice.

The discharge observations on Niagara River, resumed June 18, 1900, were continued until August 21, when the outfit started for the St. Lawrence River for similar work there, which was continued to the end of the year, in connection with some topographic and hydrographic work in May and June, undertaken for the purpose of bringing the St. Lawrence River charts up to date.

Mr. F. C. Shenehon, in charge of this party, gives the approximate discharge of the St. Lawrence at Three Points section as 199,000 cubic feet per second when Lake Ontario at Tibbetts Point is at elevation

244.9 feet above mean tide at New York and 251,000 cubic feet per second at elevation 246.9 feet.

The discharge measurements and resurvey of Detroit River will be taken up at once by the party under Junior Engineer Murray Blanchard, which was on the St. Clair River work, Assistant Engineer L. C. Sabin having been transferred in May to the new party on the *Search* for the northern Lake Michigan work.

The organization of the new party under Recorder H. F. Johnson for taking discharge measurements of the St. Marys River from the International Bridge at Sault Ste. Marie and preliminary preparations were nearly completed during June, and active operations are expected to begin at once.

The only spare self-registering gage on hand was established at Sand Beach harbor of refuge during March. Four new ones, however, are being made. one to be placed at Cleveland, one at Milwaukee, one at Escanaba, and one at Marquette.

Subreports are submitted herewith, which supply more detailed and interesting information relating to the investigations so briefly outlined above, as follows: Report by Assistant Engineer E. E. Haskell, who has had supervision of the whole, and report by Assistant Engineer F. C. Shenehon, in immediate charge of operations on the Niagara River and St. Lawrence River.

This work is now well organized, and it should be steadily pursued with all possible dispatch. In order to do so, provision should be made for an expenditure of at least $50,000 for field and office work during the year ending June 30, 1903.

A matter of equal or perhaps greater importance is the energetic continuation of the work begun this season for the correction and extension of our charts, so as to make them show the natural and artificial changes which have taken place, adapt them to the deeper draft of vessels now engaged in lake commerce, and have them show the reduced depths of water which now prevail during the navigable season. The original charts were prepared with reference to a navigation calling for a draft of only 12 feet. The soundings were referred to planes representing a mean or average stage of water, and general depths exceeding 18 feet below such planes were not closely developed, but present conditions of commerce demand that the bottom be now accurately charted to depths of not less than 30 feet in the open lakes or 25 feet in their connecting rivers or straits, and these depths should relate to ordinary "low-water" stages instead of to the "mean stage" referred to above. This will call for extensive surveys and a vast amount of office work, all of which must be done with great care and accuracy. This work has been inaugurated with a considerable force during the current fiscal year under the appropriation made by the sundry civil acts of June 6, 1900, and March 3, 1901, and means should be supplied to carry it to completion as rapidly as possible. An expenditure of $150,000 during the year ending June 30, 1903, will be necessary for such reasonable progress as the circumstances of the case require. I therefore recommend and, so far as permissible, urge that the appropriation for the year 1903 be made to cover the two amounts above indicated, as follows:

> For survey of Northern and Northwestern lakes, including all expenses of correcting, extending, and issuing charts and of investigating lake levels, with a view to their regulation, to be available until expended, $200,000.

*Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $73, 674. 57 |
| Amount allotted from act of June 6, 1900 | 2, 000. 00 |
| Amount allotted from act of March 3, 1901 | 97, 000. 00 |
| | 172, 674. 57 |
| June 30, 1901, amount expended during fiscal year | 45, 114. 30 |
| July 1, 1901, balance unexpended | [1] 127, 560. 27 |
| July 1, 1901, outstanding liabilities | 8, 646. 34 |
| July 1, 1901, balance available | 118, 913. 93 |

*Dates and amounts of appropriations for surveys of Northern and Northwestern lakes.*

| | |
|---|---|
| March 3, 1841 | $15, 000 |
| March 18, 1842 | 20, 000 |
| March 1, 1843 | 30, 000 |
| June 17, 1844 | 20, 000 |
| March 3, 1845 | 20, 000 |
| August 8, 1846 | 25, 000 |
| August 12, 1848 | 25, 000 |
| March 3, 1849 | 10, 000 |
| September 28, 1850 | 25, 000 |
| March 3, 1851 | 25, 000 |
| August 30, 1852 | 25, 000 |
| March 3, 1853 | 50, 000 |
| August 5, 1854 | 50, 000 |
| March 3, 1855 | 50, 000 |
| August 30, 1856 | 50, 000 |
| March 3, 1857 | 50, 000 |
| June 12, 1858 | 75, 000 |
| March 3, 1859 | 75, 000 |
| June 21, 1860 | 75, 000 |
| March 2, 1861 | 75, 000 |
| July 5, 1862 | 105, 000 |
| February 9, 1863 | 106, 879 |
| July 2, 1864 | 100, 000 |
| February 28, 1865 | 125, 000 |
| June 12, 1866 | 50, 000 |
| March 2, 1867 | 77, 500 |
| March 2, 1868 | $77, 500 |
| July 20, 1868 | 75, 000 |
| March 3, 1869 | 100, 000 |
| July 15, 1870 | 100, 000 |
| March 3, 1871 | 175, 000 |
| June 10, 1872 | 175, 000 |
| March 3, 1873 | 175, 000 |
| June 23, 1874 | 175, 000 |
| March 3, 1875 | 150, 000 |
| July 31, 1876 (not including $16,000 applied to survey of Mississippi River) | 84, 000 |
| March 3, 1877 (not including $25,000 applied to survey of Mississippi River and including $9,500 received from sale of steamers) | 94, 500 |
| June 20, 1878 (not including $49,500 applied to survey of Mississippi River) | 49, 500 |
| March 3, 1879 | 85, 000 |
| June 16, 1880 | 40, 000 |
| March 3, 1881 | 18, 000 |
| August 7, 1882 | 12, 000 |
| Total | 2, 939, 879 |

*Printing and issue of charts for use of navigators, and electrotyping copperplates for chart printing.*

| | |
|---|---|
| March 3, 1883 | $3, 000 |
| July 7, 1884 | 3, 000 |
| March 3, 1885 | 3, 000 |
| August 4, 1886 | 2, 000 |
| March 3, 1887 | 2, 000 |
| October 2, 1888 | 2, 000 |
| March 2, 1889 | 2, 000 |
| August 30, 1890 | 2, 000 |
| March 3, 1891 | 2, 000 |
| August 5, 1892 | 2, 000 |
| March 3, 1893 | $2, 000 |
| August 18, 1894 | 2, 000 |
| March 2, 1895 | 2, 000 |
| June 11, 1896 | 2, 000 |
| June 4, 1897 | 2, 000 |
| July 1, 1898 | 3, 000 |
| March 3, 1899 | 3, 000 |
| June 6, 1900 | 3, 000 |
| Total | 42, 000 |

*Surveys and additions to and correcting engraved plates.*

| | |
|---|---|
| March 2, 1889 | $5, 000 |
| August 30, 1890 | 10, 000 |
| March 3, 1891 | 10, 000 |
| August 5, 1892 | 5, 000 |
| March 3, 1893 | 25, 000 |
| August 18, 1894 | 25, 000 |
| March 2, 1895 | 25, 000 |
| June 11, 1896 | 25, 000 |
| June 4, 1897 | $25, 000 |
| July 1, 1898 | 25, 000 |
| March 3, 1899 | 25, 000 |
| June 6, 1900 | 75, 000 |
| March 3, 1901 | 100, 000 |
| Total | 380, 000 |

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[1] In addition to this balance reported by Major Fisk there remains of this appropriation unexpended the sum of $6,860.14.

*Printing and issuing of charts.*

| | |
|---|---|
| March 16, 1901, allotted | $75.00 |
| April 13, 1901, allotted | 165.00 |
| May 27, 1901, alotted | 1,000.00 |
| | 1,240.00 |
| June 30, 1901, amount expended during fiscal year, Detroit office | 142.00 |
| July 1, 1901, balance unexpended | 1,098.00 |
| July 1, 1901, outstanding liabilities, Detroit office | 840.84 |
| July 1, 1901, balance available | 257.16 |

### REPORT OF MR. E. E. HASKELL, ASSISTANT ENGINEER.

OFFICE SURVEY OF NORTHERN AND NORTHWESTERN LAKES,
*Detroit, Mich., July 22, 1901.*

MAJOR: I have the honor to make the following report of progress upon work pertaining to the survey of the northern and northwestern lakes, including the investigation of lake levels, for the fiscal year ending June 30, 1901.

Your attention is invited to my last annual report beginning on page 5322, of the Report of the Chief of Engineers for 1900, for a statement showing the condition of the work at the close of the previous fiscal year.

The work of the past year, for convenience of presentation, may be divided into two parts, namely:

Surveys for corrections to old and the construction of new charts, and the investigation of lake levels.

#### SURVEYS.

Under the first heading the work has been confined to surveying such localities as seemed most in need of examination. These localities were: The St. Clair River; the north end of Lake Michigan; the vicinity of the Apostle Islands, Lake Superior; the St. Lawrence River, and precise levels.

The surveys upon which the charts of these localities are based are from 30 to 50 years old, and although most excellent surveys of their time, they are now lacking in the detail necessary for showing shoal areas with the precision demanded by the present interests of lake commerce. During this period the lake vessel has grown from one of a few hundred tons drawing from 7 to 9 feet, to one of 8,000 tons drawing 18.5 feet, and, accordingly, what was safe navigation in shoal water then has now become dangerous or questionable.

*Resurvey of the St. Clair River.*—The resurvey of the St. Clair River was begun September 16, 1900, by a party under the immediate charge of Mr. L. C. Sabin, Assistant Engineer, and by the close of the field season in early December, had completed the work from the head of the river to Babys Point, a distance of 27 miles. This resurvey included the necessary secondary triangulation for controlling the work, the topography to the extent of securing a new shore line and adjacent topographic features, and very detailed hydrography. In connection with this survey the channel lying to the westward of Stag Island, from a point about 1 mile above its head to a point about 2 miles below its foot, was carefully swept for obstructions with a sweeping raft with bars set for a 20-foot draft. This sweeping found many shoal spots that the lead and line failed to discover, which must be removed before this channel can be considered opened to deep-draft vessels, and it also emphasized anew the importance of sweeping all shoal areas in the lakes and their connecting rivers, as it is the only means of determining with absolute certainty the dangers that may exist in such areas.

The work of this party was greatly delayed by the necessity of detailing it to look after the regulation of the passage of vessels past the wrecks *Fontana* and *Martin*, vessels sunk at the head of the river by collisions occurring August 4 and September 21, respectively, the wrecking of the latter vessel in close proximity to the former making this course necessary.

The opening of navigation was greatly delayed this past spring by the ice jam in the St. Clair River, which lasted until May 10, and in consequence we were somewhat delayed in starting the work of the season. Immediately after the clearing out of the ice jam a party under the immediate charge of Assistant Engineer Sabin, with the Lake Survey steamer *Search*, took the field and extended the triangulation and topography of the St. Clair River from Babys Point down to Maple Leaf, a distance of about 5½ miles. At this juncture it was deemed advisable to send this party to the north end of Lake Michigan for survey work in the open lake during the summer months, when good weather for such work could be expected. This party accordingly started north about the 1st of June and immediately began a thorough survey of the large shoal off the south end of South Fox Island, which at this writing is about completed.

*Resurvey of the waters of the Apostle Islands.*—For the resurvey of the waters of the Apostle Islands, a survey party under the immediate charge of Assistant Engineer F. G. Ray took the field May 28, which is about as early as a party can be employed profitably on exposed work in Lake Superior, and has made good progress for the short interval it has been in the field. Beginning in the vicinity of Bayfield, it has located, prepared, and measured a secondary base line, observed for azimuth, located and permanently marked 9 triangulation stations, erected 9 observing stations ranging from 6 to 20 feet in height, read the angles at 5 stations, run 12½ miles of shore topography, and sounded approximately 12 square miles of inshore and offshore hydrography.

*Resurvey of St. Lawrence River.*—A resurvey, with special reference to such features as particularly relate to navigation, of the St. Lawrence River, was begun April 27 by a small party under the immediate charge of Assistant Engineer F. C. Shenehon. This resurvey is intended to cover those topographic and hydrographic features that represent changes since the original survey made in the early seventies. It is to be based upon the old triangulation of the river, and to avoid doing any unnecessary work, Assistant Shenehon was furnished with a set of lithographs of the original detail sheets of the river for a guide in detecting new matter. So far, Mr. Shenehon has carried this work on in connection with his work of discharge measurements of the St. Lawrence, devoting only about one-half of his time to it. His work has been confined to the reach of the river extending from Ogdensburg eastward. By the close of the fiscal year he had succeeded in finding all the old triangulation stations between Ogdensburg and Waddington, a distance of 20 miles, with the exception of three, and had rerun about 5 miles of shore topography within this reach.

The labor of finding these old triangulation stations, after a lapse of thirty years, has been considerable, and Mr. Shenehon calls attention in his report to the importance of hunting up the old survey stations, re-marking them where necessary, and rereferencing them. I wish to emphasize Mr. Shenehon's remarks by adding that in my judgment no pains to recover old stations should be spared. As time advances the value of the old maps from the early surveys of the lakes will increase directly with the number of these old stations that can be found, to say nothing about labor saved in new work by being able to use these old stations.

*Precise levels.*—A precise level party, under Assistant Engineer W. S. Williams, took the field May 7 for running a line of precise levels between Buffalo (Lake Erie) and Olcott, N. Y. (Lake Ontario). This line began on the bench-mark on Buffalo light-house, followed approximately the Niagara River to Lewiston, then along the Rome, Watertown and Ogdensburg division of the New York Central and Hudson River Railroad to Newfane station, and thence to Olcott, where it was completed on June 22. The number of miles of main double line run between these points was 50.01 and 5.55 miles of side lines. These lines connect with 24 of the bench marks left along this route by the United States Board of Engineers on deep waterways in connection with their surveys for a canal route between Lake Erie and Lake Ontario, and with 12 new ones that were established by the party. These levels, with the records of our self-registering water gages at Olcott and Oswego, furnish a new connection between the old lake survey bench marks in Oswego, and Lake Erie at Buffalo, a most important link in the revision of the chain of levels connecting the lakes.

On completion of this line Assistant Williams and party were immediately transferred to Port Huron, Mich., for the purpose of extending the line of precise levels between Gibraltar and Fort Gratiot, Lake Erie and Lake Huron, from Fort Gratiot to Lexington, whence a new connection by water levels will be made with the self-registering Lake Survey gage at Sand Beach, Mich. By June 30 Mr. Williams had extended this line 5.6 miles, making a total of 55.61 miles of double main line and 5.55 miles of side line run within the fiscal year.

For the benefit of those unfamiliar with the conditions, it should be added that Lexington is the first place north of Fort Gratiot where a suitable dock can be found for placing a self-registering gage. The old dock at Lakeport, where water levels were observed for connection with Milwaukee, has been destroyed.

The wreck of the steamer *Baltimore*, a vessel of 1,160 gross tons, 201 feet long by 35 beam, wrecked May 24, 1901, off Au Sable, Mich., was located by Assistant Engineer Thomas Russell on June 22. The location of this wreck is as follows: South

17° 09′ east (about S. by E. one-half E.), true, from Au Sable Pier head lighthouse, and distant 2.81 statute miles therefrom. The wreck is in 22 feet of water about 1¼ miles offshore, and therefore a danger to navigation for vessels coasting in the vicinity.

While on this trip for the location of the *Baltimore*, Assistant Russell observed with a magnetometer for magnetic declination at Au Sable and Sand Beach. The observations at Au Sable were made on June 25, 26, and 27, and those at Sand Beach on June 29 and July 1 and 2, with the results shown in the following Table No. 1:

*Magnetic declinations.*

| Station. | Latitude. | Longitude. | Date. | Declination. | Time of elongation, ninetieth meridian. | |
|---|---|---|---|---|---|---|
| | | | | | Eastern. | Western. |
| | ° ′ ″ | ° ′ ″ | | ° ′ | *a. m.* | *p. m.* |
| Au Sable, Mich., near shore, 1,012 feet south of light-house. | 44 24 18 | 83 18 36 | June 25 | 1 09.2 W. | 6.24 | 12.30 |
| | | | June 26 | 1 28.6 W. | 6.15 | 12.05 |
| | | | June 27 | 1 34.2 W. | 5.40 | 12.00 |
| | | | Mean... | 1 24.0 W. | | |
| | | | | | | *a. m.* |
| Sand Beach, Mich., on shore, near middle of harbor ....... | 43 51 02 | 82 38 31 | June 29 | 2 39.0 W. | 6.20 | 11.30 |
| | | | July 1 | 2 44.0 W. | 7.00 | 11.40 |
| | | | Mean... | 2 41.5 W. | | |
| | | | | | | *p. m.* |
| Sand Beach, on shore, near south end of harbor....... .. | 43 50 25 | 82 38 11 | July 2 | 2 34.8 W. | 6.40 | 12.35 |

Between June 10 and 15 Assistant Russell made a detailed hydrographic survey of the shoal at the head of Russell Island, St. Clair River, which was made the subject of a small special chart issued July 5.

### THE INVESTIGATION OF LAKE LEVELS.

Under this heading work has been in progress as follows: Discharge measurements of the Niagara River at Buffalo, N. Y.; discharge measurements of the St. Lawrence River near Ogdensburg, N. Y.; discharge measurements of the St. Clair River at Port Huron, Mich.; discharge measurements of the St. Marys River at Sault Ste. Marie, Mich., and the maintenance of 15 self-registering and 4 staff water gages distributed around the lakes and along their connecting rivers.

*Discharge measurements of the Niagara and St. Lawrence rivers.*—The discharge measurements of the Niagara in progress under Assistant Engineer F. C. Shenehon at the close of the previous fiscal year were continued, and during July, 1900, 25 complete determinations were made. These, with those previously obtained, were thought sufficient for a thorough determination of the form of the discharge curve for this river for the stages of Lake Erie that have prevailed during the past three years, or from 570.79 up to 572.80 feet above mean tide at New York. At any time when Lake Erie happens to be above 573.0 more observations for the extension of the discharge curve to the higher stage will be very desirable.

On August 7 Assistant Shenehon was instructed to close up his work at Buffalo and proceed with his outfit to Morristown, N. Y., for the purpose of making discharge measurements of the St. Lawrence River. Accordingly, after permanently marking and referencing the "open section," used for discharge measurements, and making a reconnaissance of Buffalo Harbor for determination of elevation of docks and adjacent low-lying lands for data relative to effect of high lake levels, the party left Buffalo on August 21 and arrived at Morristown September 1. En route Assistant Engineer Shenehon called at Olcott, Oswego, and Tibbetts Point, N. Y., and inspected the self-registering water gage at each of these places. A special report upon this inspection, dated August 27, showed them to be in a very satisfactory condition. All three of these gages were inspected a second time during June, 1900, the two latter by Assistant Shenehon and the former by the writer, and found to be in good condition.

An examination of the river near Morristown revealed the fact that a good discharge section could not be found in this locality, mainly on account of a very feeble current. It was very apparent from an examination of the survey charts that nothing more favorable could be expected above Ogdensburg, and accordingly an examination of the river below that place was made, resulting in the selection of a section at Point Three Points.

Observations were immediately started at this section, and by the close of navigation, December 6, 39 discharges and 15 full sets of vertical curves had been measured.

Observations were resumed at this section April 28, and by June 30, 51 additional discharges had been measured, making a total of 90 obtained on this section within the fiscal year.

An effort was made to get a winter measurement of the flow of this river, but owing to the first half being rather moderate in temperature and in consequence the freezing over of the river late, only a small number of observations were obtained. For this work a section was chosen at Nevins Point, about 3 miles above Ogdensburg, where, during the latter part of February, 7 complete discharges, 525 three-point, and 44 ten-point vertical curves were measured. Moderate weather early in March spoiled the ice and thus stopped the work. While more observations would have been desirable, it is thought that enough were obtained to give a close approximation of the effect of the ice upon the volume of discharge.

*Discharge measurements of the St. Clair River.*—Discharge measurements of the St. Clair River, at Port Huron, Mich., were in progress throughout the year, with a few interruptions of short duration when it was necessary to use the party for other work. These measurements were under the immediate charge of Assistant Engineer L. C. Sabin from the first of the year until May 15, when he was relieved by Junior Engineer Murray Blanchard, who carried it forward to June 30. The total number of discharges measured during the year was 159, 126 of which were measured at section "Dry Dock" and 33 at section "Craig."

Section "Dry Dock" is the one where the measurements of 1899 and 1900 were made. This section became obstructed with ice in February, forcing the selection of section "Craig," which is a short distance above the mouth of Black River.

The interruptions to this work noted above occurred when it was found necessary to make use of this party for patrol duty in regulating the passage of vessels by the wrecks *Fontana* and *Martin* during the latter part of September and early October, and when using them for the sweeping work previously mentioned in the vicinity of Stag Island during parts of October and November.

Our winter's work in the measurement of the discharge of this river will be of exceptional value. It has thus far been a matter of conjecture as to what effect the freezing over of the river had on the volume of outflow from Lake Huron. Assistant Sabin, in his annual report, called attention to this matter, and pointed out that, while dependent upon the weather, it might be large enough to materially affect the relative stage of water in the lower lakes. We are now prepared, or will be on completion of the reduction of our observations, to throw much light upon this matter. To anticipate our results: The temperature conditions of the early winter were such that by January 20 Lake St. Clair and the St. Clair River, from its mouth to a point above Stag Island, had frozen over. The foot of Lake Huron had also frozen over and what is familiarly known as the "ice bridge" had formed at Fort Gratiot. This left open water from a point just below Fort Gratiot to a point some little distance above Stag Island. The fall between our Grand Trunk gage—near the head of the river—and the one at the mouth of Black River fell off about two-thirds. The open river above mentioned enabled us to continue discharge measurements as usual. Observations were made at section Dry Dock until such time as floating ice enough had broken off from and run under the ice bridge to block the river from near Stag Island to a point above this section. A new section, called Craig, was immediately selected above the mouth of Black River where observations were made until the ice broke up near the last of March. Almost immediately after the closing of the river in January, as above outlined, the discharge fell off approximately 50 per cent, and did not resume normal conditions of flow until the river became clear of ice about the middle of May. During the general breaking up of the ice, immense masses of it were forced into the river by northerly winds and so choked the flow that for a time but very little water could have found its way through. For some days Lake St. Clair was but a few inches above the level of Lake Erie. This condition of restricted flow has made itself manifest in the relative elevations of Lakes Huron and Erie, and we find that for the month just closed Lake Huron was 0.55 foot higher, while Lake Erie was 0.75 foot lower than during June, 1900. Here then is the explanation for the present low stage of water in Lake Erie, which will be thoroughly substantiated when the results from the complete reduction of our observations are ready for presentation.

*Discharge measurements of the St. Marys River.*—A party under the immediate charge of Recorder H. F. Johnson began preparations for the measurement of the discharge of this river from the International Bridge, at Sault Ste. Marie, Mich., June 8. The remainder of the month was devoted to the preliminary work of establishing gages, connecting them by levels, and preparing the outfit for working from the bridge. Discharge measurements are now in progress.

*Water gages.*—A new self-registering gage was established at Sand Beach, Michigan, during March. This made the fifteenth one established, the locations of which are as follows, counting from the foot of the lakes: Ogdensburg, St. Lawrence River; Tibbetts Point, Oswego, and Olcott, Lake Ontario; Buffalo, Lake Erie; Amherstburg and Windmill Point, foot and head of Detroit River; Roberts Landing and three in the vicinity of Port Huron, St. Clair River; Sand Beach, Lake Huron; Mackinaw City, Straits of Macinac; two at Sault Ste. Marie, above and below locks, St. Marys River; with staff gages that were read tridaily at Marquette, Lake Superior; Escanaba, Green Bay; Milwaukee, Lake Michigan. A staff gage was read tridaily at Sand Beach until after the self-registering gage was established, since which time only one staff reading, taken daily at 12 m., has been made. All of the self-registering gages have rendered a satisfactory record, and a part of these records have been read and reduced. They have not been prepared for publication, for it is thought best not to publish the results until after they can be referred to the revised levels that are now under consideration. The gage at Buffalo was inspected by Assistant Shenehon in October and by the writer in June. The gages along the Detroit and St. Clair rivers were under the direct supervision of assistant engineers throughout the year. The gage at Sand Beach was inspected by Assistant Sabin during February. The gages at Mackinaw City, Sault Ste. Marie, and Escanaba were inspected by the writer in November.

A contract for four new self-registering water gages of the lake survey pattern was let to Mr. Louis J. Wohnlich, instrument maker, Detroit, Mich., March 25, and are now nearing completion. These gages are intended for the following stations: Cleveland, Milwaukee, Escanaba, and Marquette.

Office work upon the reduction of all data pertaining to the survey work was prosecuted during the year as fully as possible, but the great demand for field work upon the small organization of the survey has prevented our keeping it up to date, and we are therefore unable, much to my regret, to give our results in full for work accomplished.

Assistant Engineer F. C. Shenehon has submitted a report, which follows, giving an account of his year's work more in detail than presented herein, to which attention is invited.

In closing, I wish to express my appreciation of the untiring efforts, of not only chief of parties, but all of their assistants, to make the year's work one satisfactory both in quantity and quality.

Very respectfully, your obedient servant,

E. E. HASKELL, *Assistant Engineer.*

Maj. W. L. FISK,
*Corps of Engineers.*

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### REPORT OF MR. FRANCIS C. SHENEHON, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
*Ogdensburg, N. Y., July 1, 1901.*

MAJOR: I have the honor to submit a report of the operations during the past twelve months of the party in my charge.

The beginning of the official year found the party at Buffalo, with office quarters at No. 33 Austin street.

The velocity measurements on the open section of Niagara River, which had been begun in late June to catch the volume of outflow of Lake Erie at the annual high-water crest, were continued in July—25 discharges, 19 partial vertical curves, and 6 transverse curves being secured.

Work on the river gave way to observations for the calibration of the current meters used in this work. These ratings were made in the still-water basin of the Prospect reservoir of the Buffalo waterworks.

The methods used in the hydraulic work on the Niagara River were described in detail in my report of last year. See Report of Chief of Engineers, 1900, Part VIII, pages 5326 et seq.

The observations of July will extend the discharge curve securely to Lake Erie stage 572.86, or mean lake level.

The discussion of the observations, together with a final least-square adjustment of the discharge curve of the Niagara River, is reserved for a future report.

Self-registering water gage No. 11, at the Breakwater light, Buffalo Harbor, was maintained in operation with frequent inspections up to August 20, and was then placed in the care of Mr. Amherst E. Gunn, the light keeper.

Gage No. 12, in the Austin street slip, was discontinued on the 1st of August.

In early August a survey was made of the elevations of the docks of Buffalo, and of low-lying shore lands in connection with the effect of high lake levels.

In anticipation of work in the swift currents of the St. Lawrence, the tug *U. S. Lake Survey No. 1* was fitted with a new wheel, made by Trout, of Buffalo. Speed tests before and after changing wheels showed no appreciable gain, but the new and larger wheel cut down the revolutions from 211 to 165 per minute. While in dry dock for the wheel change, the shaft, which was found out of true, was straightened and the hull was recalked and painted.

The survey catamaran was taken apart for lake towing, and the steel hulls scraped and repainted.

The office and survey equipment was packed and loaded on the tug; and on August 21 the fleet dropped down the Niagara River to the Welland River, under orders to proceed to the St. Lawrence River. The courtesy of the superintendent of the Welland Canal had provided me with a "Let pass" on that canal, and Port Dalhousie, on Lake Ontario, was reached the following day.

As my orders involved the inspection of self-registering gage No. 13 at Olcott, No. 14 at Oswego, and No. 15 at Tibbetts Point, these places were visited. The results of the inspection were contained in my report of August 27, 1900.

The work outlined by Assistant Engineer E. E. Haskell for my party on the St. Lawrence involved elaborate discharge measurements of this river and surveys for the correction of the river charts.

I was instructed to examine a discharge section at the constricted point just below Morristown, N. Y.

While in this vicinity, Recorder H. F. Johnson, who had acted as my first assistant up to this time, was detailed for work on the St. Clair River, and Recorder A. H. Horton succeeded him.

An examination of the Morristown section showed a current of about 1 foot per second, too sluggish for rapid evolutions of the catamaran. This boat, which carries the velocity-measuring instruments and the observing party, is hung in the current by a long wire extending to an upstream anchor. Its lateral movements in passing from station to station are dependent on the propulsion of the passing water. If the current is slow, progress is slow.

An upstream wind will prevail over a sluggish current and send the boat upstream, and a cross-river wind would block lateral movements against it.

It was found, moreover, that the long stretch of river from the Galops Rapids to Morristown, about 15 miles, developed so heavy a sea with an east wind blowing that the dancing of the survey boat made the velocity indications of the instruments of doubtful value.

The Morristown section, after a fair test, was therefore abandoned, and the abandonment of this section forced operations into the swifter river below the Galops Rapids.

The section above Leishman Point, which was the second section indicated for examination, was narrow, with a smooth, straight, positive current, and provided with a good base for cut-off ranges on the head of Ogdens Island.

At midstream with a fairly low stage of water the velocity showed nearly 8 feet per second, with a depth of 45 feet.

For stages that might later be expected this velocity would amount to 10 feet per second, which is too high for facile work.

In addition to this high velocity, which would constantly threaten to part the anchor line or drag the anchor, the Rapids du Plats are immediately below, and a break in the anchor line would send the catamaran over the shallows, endangering instruments and causing delay in getting back to the section.

These objections prevailed and a new section just above Point Three Points was tested. This showed a maximum velocity of about 5.5 feet per second, with a midstream depth of 60 feet and a width of 1,686 feet between terminal crib locations.

The stream approaches this section from a long, straight course. It is free from "boilers" and eddies.

Open fields on each side of the river give good sites for range systems.

The bottom profile is sinuous, with no abrupt changes, showing a compact stream section.

Terminal cribs were set up to carry the long range section gages north and south.

The river width was divided into 17 stations of 100 feet each, except station 1, on the Canadian end, which was but 86 feet in width.

Preliminary observations on a trial section had developed the direction of flow, and the final section was set nearly normal to the predominant current threads. It was called Three Points section.

After the failure of the Morristown section, the party had proceeded to Ogdensburg.

A reconnoissance of the river below this, as far as Waddington, had pointed out the head of the Galops rapids as the weir which held in check the waters of Lake Ontario, and it became apparent that the discharge would vary as a function of the water level here. For this reason, self-registering gage No. 12 was set up on the dock of the Terminal Elevator Company, in the eastern part of Ogdensburg.

With a view to winter work on a still-water section, when the ice bridge should form above Ogdensburg (for between this city and Montreal the river is open throughout the winter), and with an eye also to future chart surveys, Ogdensburg, the metropolis of this region, was chosen as headquarters.

Through the courtesy of Mr. Charles A. Kellogg, collector of the port and custodian of the Federal building, a large corner office room on the first floor of this building was assigned by the Secretary of the Treasury to the Lake Survey, with additional storage room in the basement.

Possession of this office was taken on October 22.

Meanwhile Three Points section was sounded in the same manner as the open section of the Niagara River, ranges set up, and discharge measurements were begun on September 26.

These were continued until December 6. During this time 39 measurements of the discharge were taken.

During the season 1901, beginning in late April, 51 additional measurements were taken, making 90 in all up to July 1.

During the fall of 1900 all work necessary for the station constants was completed. The section was re-sounded in December.

Three current meters were used in the work—L. S. 1B, L. S. 2B, and L. S. 4A.

The first was used in 1900 as a "standard" meter, and the other two were rated in the current in comparison with it.

The standard meter was rated on a still-water base, established in the mill pond above Waddington, N. Y., on November 6, 17, and 20, and on an ice base in the same place on December 26 and 27, 1900, and January 4 and 5, 1901.

All meters were rated in late November on the still-water base, and again in December–January on the ice base; again in May, 1901; and finally during the last days of June. The methods of rating were similar to those used by me in Buffalo, except that meters were rated one at a time, and when by boat, with the meters suspended from a boom well in advance of the bow of the boat.

Frequent ratings have characterized the work, and too much stress can not be laid on the desirability of this procedure.

In discharge work the index was chosen at the four-tenths depth.

All coefficient work was done simultaneously with the discharge observations. Fifteen full sets of vertical curves were observed at each station in this way, or 255 in all.

Four programmes of observation were used, of varying complexity:

1. Single meter at the index. Observations Nos. 1–5.
2. Two meters at the index. Observations Nos. 40–90.
3. One meter at the index, while the other occupies successive points on the vertical curve, getting simultaneous percentage velocities for coefficient determinations. Observations Nos. 6–19.
4. Same as above, with current ratings in comparison with the standard meter. Observations Nos. 20–39 (mostly).

The second method was used in the spring and early summer of 1901. The object was to make the discharge depend on the ratings of no one meter, but to utilize, two at a time, the three meters which form our equipment.

By the third and fourth methods data in addition to discharge work were obtained for coefficient work. The results secured during the fall of 1900 were so satisfactory that no additional work seemed desirable in 1901.

The direction of the current with relation to the normal to the section was observed as on the open section, Niagara River.

The detail of gaging an open-river section is so fully described in my report of last year that it is unnecessary to enter into any enlargement.

During the winter and early spring the hydraulic work was reduced, constants computed, and the volume of flow determined, as indicated by observations Nos. 1–39. The work of April and May, 1901 (observations Nos. 40–69), with velocities as shown by a single rating of meter L. S. 4A, have been taken out.

This gives an approximate discharge curve. Additional observations, and velocity adjustments involving the three meters, and all ratings will alter this line somewhat. It is therefore judged inexpedient to publish this preliminary curve.

Since, however, a statement of the approximate discharge of the St. Lawrence may be of interest and of utility, the following values are given:

| Gage No. 12 at Ogdensburg. | Volume of discharge cubic feet per second. |
|---|---|
| 244.00 | 199,000 |
| 246.00 | 251,000 |

The increment of discharge for a rise of water of 0.1 foot is 2,600 cubic feet. The probable error of this statement may be 1 to 2 per cent.

The gages at Tibbetts Point and Ogdensburg depend on the precise levels run by Mr. David Molitor for the Board of Engineers on deep waterways in 1898.

By these levels the zero of the old gage at Ogdensburg (6.75 feet below the sill of the door of the lighthouse tower) is 245.66.

The slope between gage No. 15, at Tibbetts Point, and gage No. 12, at Ogdensburg, is about 0.9 foot.

It follows when Lake Ontario at Tibbetts Point is at elevation 244.9, the discharge of the river at point Three Points is 199,000 cubic feet, and at elevation 246.9 it becomes 251,000 cubic feet.

In outflow discussions it is a convenient fiction to regard the St. Lawrence as far as the Galops rapids as an arm of Lake Ontario. From the point of view of lake regulation the flow of the river at Tibbetts Point is of little concern, and if it is greater than the flow at the Galops rapids in summer, due to losses by evaporation in 70 miles of river, and greater in spring because of local inflow on this stretch, the main problem is not largely affected.

The gain or loss in the 10 miles between the discharge weir at the Galops Rapids and section Three Points and the change of storage due to gage changes should be introduced as corrections to discharge, to reduce the probable error of single observations.

These matters will be fully discussed in a future report, in which all adjustments will be made and a full statement of results detailed.

It must be stated that until the precise level line run to Tibbetts Point is connected with Oswego levels by the self-registering gages at these two points the discharge volumes, as above stated, mean little.

The interpretation lies in the relation of the gage heights given and some well-accepted lake stages, as mean lake level at Oswego. Mean lake level in terms of Tibbetts Point gage or Ogdensburg gage can not yet be given.

During the latter part of February a measurement of the winter flow of the St. Lawrence was made at Nevins Point section, about 3 miles above Ogdensburg. This is the same section used by the deep waterways board in the fall of 1898.

On the first formation of an ice bridge the section was laid out and sounded at 20-foot intervals for cross-sectional area.

Twenty-six stations 200 feet apart were established for index measurements.

Observations were made by the 2-meter method, the instruments being let down through trapdoors in the floor of an observing house on runners. This 10 by 10 foot house was drawn from station to station by a horse. It was fitted with a stove and a recording desk.

Seven complete discharge measurements were taken and 525 three-point and 44 ten-point vertical curves measured.

These measurements were followed by low velocity meter ratings in a still-water area inclosed by the dock of the Klondike planing mill, about a mile above Ogdensburg.

All three meters were carefully rated on this ice base in March.

The results of the winter measurements have not been fully worked out, but no large retardation of the flow because of the ice perimeter is indicated.

During the few weeks in which outside work did not engage the party, the reduction of the field notes and the interpretation of the observations were in progress. In addition, the work of making permanent records of the gage sheets, taking off the hourly elevations of the water surface, and getting out daily and monthly means was carried on for gage No. 11, Buffalo; 12, Ogdensburg; and 15, Tibbetts Point.

Gage No. 11 was inspected by me in October, 1900; and gage 14, Oswego, and 15, Tibbetts Point, in June, 1901, as detailed in special reports.

During April, the steamer *U. S. Lake Survey No. 1* was repaired, and additional room gained by extending the cabin.

The main work done on the Lake Survey charts during 1900 was an investigation looking to the correction of the names of the towns, islands, points, etc., below Ogdensburg.

During May and June, 1901, the stations of the secondary triangulation of 20 miles of river, from △ Windmill to △ Waddington were relocated and targeted, and in some cases remonumented.

△ Edwardsburg was destroyed by the new Cardinal Canal excavation.

△ Iroquois is submerged by the new level of canal and was not found.

△ Robertson was destroyed by excavation for the double tracking of the Grand Trunk Railway.

All others are intact.

Stadia circuits were run on the American shore about 5 miles from △ Red Mills to near △ Sheldon, establishing shore stations and checking topographical features. This was preceded by the graduation of the stadia rods and the field determination of the wire intervals of the instruments.

Preparations have been made for the relocation of the remaining stations of the secondary triangulation, and for a resurvey of the river to note changes since the original surveys, thirty years ago.

I wish to record my conviction, growing out of my experience in relocating the stations on the twenty miles of the St. Lawrence noted above, that the time is ripe for a systematic search for the triangulation stations and bench-marks of the Great Lakes, and a remonumenting, where necessary, and a re-referencing of them.

Most of these stations are not intervisible, and instrumental locations are therefore not possible without building high stations to look over tree tops.

In the original referencing the stations were tied into trees, bowlders, and buildings, in most cases. Many trees have died and their stumps have been removed; bowlders have been split up and put into stone walls; buildings have been torn down or rebuilt on new lines. Surface monuments have been plowed up in many places. The relocation of the bottom stone, buried two and a half feet in the earth, when the references have disappeared, is expensive and tedious.

In re-referencing stations property lines should be utilized wherever available as permanent features.

I have been assisted in the work of this river by Mr. A. H. Horton, who was promoted from recorder to junior engineer on May 16, in recognition of his excellent work.

On June 25, Recorder R. F. Proctor, and on June 26, Recorder A. F. Armstrong, reported for duty in connection with the resurvey of the St. Lawrence.

Very respectfully, your obedient servant,

FRANCIS C. SHENEHON,
*Assistant Engineer.*

Maj. W. L. FISK,
*Corps of Engineers.*

## E E E 2.

## ANNUAL WATER LEVELS OF THE NORTHERN AND NORTHWESTERN LAKES.

Tridaily observations were made at Charlotte and Oswego, N. Y., on Lake Ontario; at Erie Harbor, Pa.; Ashtabula and Cleveland, Ohio, on Lake Erie; at Milwaukee, Wis., on Lake Michigan, and Escanaba, Mich., on Green Bay; at Sand Beach, Michigan, on Lake Huron; and Marquette and Sault Ste. Marie, Mich., on Lake Superior, from July 1, 1900, to June 30, 1901.

The accompanying table is a continuation of that published in the Annual Report of the Chief of Engineers for 1900, Part VIII, page 5402

| Stations. | 1900. | | | | | | 1901. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May. | June. |
| | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* | *Feet.* |
| Charlotte | 3.22 | 3.50 | 3.94 | 4.26 | 4.48 | 4.24 | 4.29 | 4.36 | 4.61 | 3.60 | 3.16 | 3.05 |
| Oswego | 3.28 | 3.56 | 3.98 | 4.37 | 4.53 | 4.26 | 4.42 | 4.48 | 4.71 | 3.47 | 3.18 | 3.06 |
| Erie | 2.57 | 2.71 | 2.96 | 3.32 | 3.38 | 3.38 | 3.46 | 3.87 | 4.07 | 3.92 | 3.83 | 3.30 |
| Ashtabula | 2.59 | 2.68 | 2.98 | 3.28 | 3.36 | 3.39 | 3.54 | 3.92 | 4.07 | 3.74 | 3.70 | 3.25 |
| Cleveland | 2.77 | 2.80 | 3.12 | 3.36 | 3.62 | 3.66 | 3.76 | 4.11 | 4.23 | 3.82 | 3.80 | 3.39 |
| Milwaukee | 4.22 | 4.05 | 4.10 | 4.09 | 4.23 | 4.56 | 4.80 | 4.83 | 4.41 | 4.26 | 3.88 | 3.78 |
| Escanaba | 4.37 | 4.14 | 4.22 | 4.21 | 4.47 | 4.62 | 5.03 | 4.89 | 4.76 | 4.36 | 4.06 | 3.89 |
| Sand Beach | 4.23 | 4.14 | 4.06 | 4.12 | 4.12 | 4.32 | 4.56 | 4.70 | 4.71 | 4.24 | 4.03 | 3.93 |
| Marquette | 2.74 | 2.38 | 1.86 | 1.78 | 1.81 | 2.19 | 2.54 | 2.84 | 3.04 | 3.10 | 2.81 | 2.71 |
| Sault Ste. Marie | 2.72 | 2.52 | 2.03 | 1.91 | 1.88 | 2.27 | 2.67 | 2.94 | 3.19 | 3.05 | 2.72 | 2.72 |

# APPENDIX F F F.

## IMPROVEMENT OF THE YELLOWSTONE NATIONAL PARK, INCLUDING THE CONSTRUCTION, REPAIR, AND MAINTENANCE OF ROADS AND BRIDGES.

### *REPORT OF CAPT. H. M. CHITTENDEN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

UNITED STATES ENGINEER OFFICE,
*Sioux City, Iowa, July 11, 1901.*

GENERAL: I have the honor to transmit herewith report upon improvement of Yellowstone National Park for the fiscal year ending June 30, 1901.

Very respectfully, your obedient servant,

H. M. CHITTENDEN,
*Captain, Corps of Engineers, U. S. A.*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*

## IMPROVEMENT OF YELLOWSTONE NATIONAL PARK.

### OPERATIONS FOR SEASON OF 1900—AFTER JUNE 30.

At the close of the last fiscal year the programme of work in the Park for the ensuing season had been laid out and operations were begun as soon as the appropriation was available. The appropriation (act of June 6, 1900) gave $60,000 for the improvement and protection of the Park, of which sum $20,000 was required by law to be expended in building a new road from the outlet of the Yellowstone Lake to the east boundary of the forest reserve in the valley of the Shoshone River. There was expended for the purposes of administration and protection by the acting superintendent of the Park the sum of $6,438.60, leaving the sum of $33,561.40 for improvement work apart from that on the east road. Of this sum $3,712.04 had been expended in annual repairs prior to June 30 under a proviso in the sundry civil act making the sum of $5,000 immediately available. This left the sum of $29,849.36 available for the work of improvement during the fiscal year 1901. The expenditure of this sum has fallen under the following heads:

General repairs and maintenance.
Golden Gate viaduct and road through canyon.
Gardiner River Canyon road and bridge.
Road from Golden Gate to Middle Gardiner Falls.
Trail to the summit of Mount Everts.
Road down Gibbon River on western approach.
New plant.

The general expenses of administration, including office supplies, telegrams, expressage, traveling expenses, mileage, etc., have amounted to about 10 per cent of the total and are apportioned pro rata among the various divisions of the work.

### GENERAL REPAIRS AND MAINTENANCE.

The work under this head is described in detail in the report of Overseer A. E. Burns, appended to this report. (Appendixes C and D.)

The only work of especial importance, apart from the regular repairs covering the entire road system, was done on the road across Shoshone Basin, between the Upper Geyser Basin and the Yellowstone Lake. The entire line of the road down the hill east of the first crossing of the Continental Divide was widened, the curves diminished, the grades evened up, and the road resurfaced. The work was done during an excessively dry season, when the newly formed surface would not pack, and its benefits were not apparent until after the first fall rains. This part of the road is now in excellent condition, scarcely inferior to a macadamized pavement.

A considerable distance of the very sandy stretch of road around Shoshone Point was given a rock bed, and this was covered with clay. The combination has given a very successful result so far, and the work will be somewhat extended during the present season.

### GOLDEN GATE VIADUCT AND CANYON.

The condition of the old wooden bridge at this point had become such as to excite general uneasiness and concern among the traveling public, and although still safe it was felt that its reconstruction could not long be deferred anyway and might as well be taken up at once. After a thorough study of the site it was decided that a concrete structure would be better adapted to the situation than any other. It could be undertaken without previous accurate measurements, which would be very difficult to make while the old bridge was in place. If steel were used these measurements would have to be determined before the material could be ordered and would so delay the work that it could not be done during the season. With concrete this made no difference, for whether the foundation went a little lower or not so low as estimated the material was of a character that would adapt itself to any irregularities or variations. The site was therefore surveyed without stripping the foundation and the necessary cement for the work was ordered. The rock and sand were found near the site.

It was decided to build the new viaduct in a series of arches. The piers were spaced 18 feet from center to center, and were made 3 feet thick and carried down to firm rock. The rise of the arches was fixed at 2 feet; the thickness at the crown at 12 inches and at the springing line at 18 inches. The arch was reenforced at the crown with wire netting made of No. 8 B. G. steel wire with meshes 5 by 1⅝ inches, the long dimension of the mesh being parallel to the axis of the bridge. The netting was placed 4 inches above the lower surface of the arch and extended 3.75 feet on each side of the crown. A parapet wall 42 inches high above the crown of the arch was provided on the side opposite the cliff. It was given a thickness of 12 inches at the top and 16 inches at the crown of the arch. To strengthen it further against any outward pressure, four pieces of 60-pound steel rail 4 feet long were placed obliquely so as to extend through the concrete of both the arch and the parapet.

The materials used were Atlas Portland cement and a natural mixture of gravel and sand found on the Swan Lake flat, three-fourths of a mile from the work. The mixture seemed comparatively free of dirt and was used just as taken from the pit. The proportions of the mixture were on a basis of 1 cement, 2 sand, and 4 gravel.

The execution of the work was of extraordinary difficulty. There was an almost constant gale of wind through the canyon, which was frequently of such force as to compel a suspension of work. During the period of concrete mixing this was a most troublesome matter, and it was found necessary to commence work each day about daylight and suspend about 11 a. m. The site of the work was very contracted, and operations were seriously hampered for lack of room to work. It was, moreover, a dangerous situation, being on the face of the cliff, where any misstep would cause a fall of from 20 to 75 feet.

The necessity of interrupting tourist traffic as little as possible made great haste necessary in the execution of the work. During the time of actual construction a temporary road was provided via Snow Pass. This road was about 1½ miles longer than the regular route and had some steep grades, but nothing unsafe. The greatest drawback was the excessive dust. There was scarcely a drop of rain from the time it was opened until traffic returned to the regular road and the newly moved earth cut up into a fine powder from 6 to 12 inches deep.

The work was under the immediate charge of Mr. C. E. Sherman, United States assistant engineer, whose report is appended hereto. (Appendix A.)

The old bridge was closed to traffic on the 6th of August, and was reopened just four weeks later. After the resumption of traffic, work continued on the viaduct and through the canyon, and was not completed until nearly the end of October. One interesting feature of this later work was the removal of the large rock which stood at the entrance to the old bridge and partially blocked the roadway which passed between it and the cliff. The changes involved in the new structure necessitated the removal of this rock. As it was the unanimous desire of those familiar with the park that this unique and picturesque feature be retained, the rock was broken off, lifted about 6 feet to the new grade, moved out about 6 feet and down the road about the same distance, where it was set up on a new foundation, consisting of a square column of concrete 3 by 3 feet and 24 feet high. The whole foundation was then covered up, so as to remove all evidence of its artificial character. This rock weighed about 23 tons, and as its removal took place on the steep face of an unstable cliff it had to be managed with great care. It was done under the personal direction of Foreman Robert Walker, with a force of four men. The whole operation consumed five days and cost $40, not including the concrete foundation, which cost about $80.

In connection with the reconstruction of the viaduct it was planned to rebuild the entire road through the canyon a distance of 2,000 feet. The grades were reduced from 15 and 18 per cent to 8 per cent, and the roadway widened from a single carriage width so that teams can everywhere pass each other with ease and safety. About two-thirds of this work was done in the season of 1900.

### THE GARDINER CANYON ROAD.

Nothing was done on this work except to purchase the material for the bridges and for a derrick. The funds available did not permit any actual work on the ground.

### ROAD TO MIDDLE GARDINER FALLS.

This is one of the roads classed as a side road in the general project. It is intended to give access to a very interesting portion of the park scenery, the Middle Gardiner Canyon and falls. It was built for a distance of about 3 miles from the main road just above Golden Gate to within a quarter of a mile of the falls.

### GIBBON RIVER ROAD.

This road extends from the western approach at the mouth of the Firehole River along the north bank of the Gibbon for about four miles, where it crosses this stream and intersects the belt line near the tenth milepost from Norris. The road cuts off from 2 to 3 miles of distance on the old line and is an important addition to the road system. The work is still incomplete, only enough being done to make a safe, single-track roadway. It will be gradually enlarged to its full width.

### NEW PLANT.

The more important additions to the plant during the season consisted of:

1 two-seated surrey for inspection uses.
1 single-seated run-about for same purpose.
1 boom derrick with complete fittings.
1 hoisting engine.
2 dump carts.
2 handcarts.
1 pile-driving outfit except the woodwork.
6 wheel scrapers.
63 tents.

There was also received one rock-crushing outfit complete, transferred to the work by authority of the Chief of Engineers, U. S. A. The cost to the appropriation was that of freight and drayage only, amounting to about $380.

### EAST ROAD.

Work on this road was begun immediately after the 1st of July and was continued until near the end of October. The details of the work are described in the report of Assistant Engineer Crecelius herewith. (Appendix B.)

A great deal of care was taken in determining the best route across the Absaraka range, which extends along the east boundary of the Park. There are only two practicable crossings, Jones Pass and Sylvan Pass, and both of these are excessively difficult. Sylvan Pass is nearly 1,000 feet lower than the other, and this fact alone made it very desirable to utilize it if possible to do so. But the physical obstacles were very great, and it was only after repeated reconnaissances that it was decided to undertake it. The pass is one of great scenic beauty and will be an important addition to the attractions of the Park.

This governing point of the road being settled, the rest of the location followed as a matter of instrumental survey mainly, for the two termini were fixed by law—one at the outlet of the Yellowstone Lake and the other where the Shoshone River[1] crosses the east boundary of the reserve. The crossing of the Yellowstone River is about one-fourth of a mile below the lake and connects with the belt line about 1,000 feet distant and 1½ miles from the Lake Hotel. The road then passes by a straight line over almost level ground and through a dense forest to the valley of the Pelican Creek. This valley is a swamp about one-half mile wide and is crossed by an embankment 4 feet high above the level of the swamp. Both the Yellowstone River and Pelican Creek are crossed by pile bridges. From Pelican Creek the road passes along the north shore of Indian Pond, the west shore of Turbid Lake, and crosses a low pass east of Lake Butte between the waters of Bear and Cub creeks. It crosses the latter stream above the hot springs located in its valley and then skirts the southwestern declivity of the hills that separate the valley of Cub and Clear creeks. On both sides of Cub Creek the road is led along sidehill slopes that afford fine views of the Yellowstone Lake.

The road ascends the valley of Clear Creek on the north side to its source in Sylvan Pass. This place is one of scenic attractions unsurpassed in any part of the mountains. Sylvan Lake is a small but exceedingly beautiful sheet of water near the summit of the pass, which is about 2 miles farther east. Between this lake and the pass there is a small but deep pond fed by the melting snows that drift into the valley. The bed of this lake is so porous from its composition of broken rock that the water falls upward of 15 feet in a dry season below the overflow level of spring.

From this pond east to a large spring presently to be referred to, a distance of about 1 mile, is the pass proper. It lies between high dominating peaks, which rise directly on both sides of the pass to elevations above it varying from 1,000 to 2,000 feet, the pass itself being about 8,600 feet above the level of the sea and 900 feet above the level of the Yellowstone Lake. The two most prominent peaks on the north are Avalanche and Hoyt peaks, and on the south Grizzly and Top Notch peaks. Although the summits of these peaks are about 2 miles apart, the gorge between them which constitutes the pass is very narrow. It is unique among mountain passes in that it is almost entirely occupied with broken rock, which has apparently been loosened from the cliffs on either side by the action of frost. This broken rock varies in size from fine pebbles to pieces a cubic yard in volume.

The descent from the pass on the east to the valley of the North Fork of Middle Creek is excessively steep, and it will be a matter of great difficulty to carry the road down with a grade even as small as 10 per cent. Just at the foot of this descent and within a short distance of the North Fork of Middle Creek is a very large cold-water spring from which a strong, clear stream flows. From this spring the road follows the valley of the North Fork to its junction with the main stream, a distance of nearly 4 miles. This is the most difficult portion of the entire route, for the slopes are excessively steep, the ground in many places unstable, the mountain sides subject to avalanches and landslides, and the ground everywhere filled with huge bowlders which have been washed down in past ages. The exact location over this distance has not yet been determined. From the junction of the North Fork with the main stream of Middle Creek the road will probably follow the north bank to its junction with Shoshone River, a distance of about 7 miles. The work along this part of the route, though much easier than along the North Fork, will still be very difficult.

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[1] This stream has heretofore been known as the Stinkingwater River. It was so named in 1807 by its discoverer, John Colter, who came upon it where there is a large tar spring near the junction of the two forks and gave it the name on account of the impression received at this particular point. The name was wholly inappropriate as the stream is one of the finest in the mountains, both in the purity of its water and the character of its scenery. Local usage has succeeded in changing it to "Shoshone," but this change has never received official recognition. As the valley of the river will soon be followed by a tourist route from upward of 50 miles, it was considered important that an appropriate name be adopted, and acting upon a recommendation from this office to the governor of Wyoming, the legislature of that State passed an act (February 14, 1901) changing the name to Shoshone. The stream will hereafter appear in the official reports and maps of the Park under its new name.

From the junction of Middle Creek with the Shoshone the road will follow the latter stream, most of the way on the north bank. With the exception of the river crossings, the work over this distance will be much lighter than on any other portion of the route. The scenery along the entire valley of this stream is on the highest scale of grandeur and sublimity. The work on the east road has been costly, owing to heavy grading at the crossings of the Yellowstone and Pelican valleys and the delay caused by the necessity of transporting supplies by water over a portion of the distance. Two weeks' time was practically lost by having to use the force to fight forest fires.

The work on the east road was in the immediate charge of Mr. S. F. Crecelius, U. S. assistant engineer. It was a work of unusual difficulty, involving a great deal of physical discomfort.

*Summary of expenditures on the east road.*

| | |
|---|---|
| Yellowstone River, crossing and approaches | $2,072.50 |
| Pelican Creek, crossing and approaches | 2,526.53 |
| Clearing and grubbing and grading | 9,670.10 |
| Surveys and exploration | 2,514.06 |
| New plant | 1,765.58 |
| Office and miscellaneous | 1,451.23 |
| Total | 20,000.00 |

### GENERAL OBSERVATIONS ON THE SEASON'S WORK.

The season was one of excessive drought, breaking all previous records in this respect. Fires broke out in a few places, but did not obtain much magnitude except along the shore of Shoshone Lake. At the request of the superintendent such of the road force as could be spared was set to work fighting this fire. The actual cost of the work for the time so spent amounted to $1,750, but the most serious feature was the interruption of the work at the very time when it was progressing most rapidly.

### OPERATIONS OF THE SEASON OF 1901—TO JUNE 30.

### UNDER APPROPRIATION ACT OF JUNE 6, 1900.

Work was resumed April 24 in the Golden Gate Canyon, under the project approved June 22, 1900, and was completed on the 25th of May. The entire balance of appropriation was expended on this work.

### APPROPRIATION ACT OF MARCH 3, 1901.

The amount appropriated by this act was $113,000. Under date of March 21, 1901, the Chief of Engineers approved a project for the expenditure of this appropriation under the following heads:

1. New road from top of Yancy Hill to Soda Butte and Tower Falls, including two new steel bridges over the Lamar and Yellowstone rivers.
2. Completion of road and bridges in the lower Gardiner Canyon.
3. Continuation of work on the eastern approach, including a bridge over the Yellowstone River at the outlet of the lake.
4. Extensive reconstruction of road along southern approach, including bridges over Lewis River and Crawfish Creek, the opening of about 19 miles of new road in the Teton Forest Reserve between the south boundary of the Yellowstone Forest Reserve and the mouth of Buffalo Fork of Snake River.
5. General repairs and completion of unfinished portion of the roads. Besides the general work of maintenance which covers all the roads, the following special pieces of work were included: (*a*) Continuation of the extensive repair work begun last season over the Continental Divide; (*b*) completion of the wagon trail around Bunsen Peak; (*c*) opening of a wagon trail from West Thumb to Natural Bridge to avoid the necessity of costly repairs on lake shore road; (*d*) completion of work on Golden Gate Viaduct.

Authority was also granted to repair patrol stations throughout the Park for the acting superintendent, as a return for assistance of various kinds rendered to the work.

The appropriation for the current year was available immediately upon the passage of the act, and preparations were accordingly made to commence work as soon as the weather would permit. A contract was entered into with C. B. Scott, of Gardiner, Mont., under date of March 22, 1901, for furnishing the necessary teams. Purchases were made during March and April of nearly all the new plant, material, and subsistence supplies required for the season's use. The month of April was exceedingly stormy and work did not begin in earnest until about the 1st of May. By the 1st of June the entire organization was in the field carrying on the work at all points covered by the project for the season.

There are five large working parties engaged in grading, clearing, etc.; one large bridge party, one sawmill party, and four small road-repair parties. The new work on the line near Yanceys is under charge of Assistant Engineer E. D. Vincent; that on the east road is under Assistant Engineer S. F. Crecelius, and that on the south road is under Assistant Engineer M. T. Fowble. The total force engaged on the work in the field is as follows: One overseer, 3 assistant engineers, 1 master carpenter, 1 master mechanic, 5 master laborers or foremen, 4 subforemen, 252 employees (cooks, blacksmiths, herders, drivers, laborers, etc.), 65 teams, 20 saddle and pack animals.

The work accomplished to June 30 is as follows:

The new road has been extended about 3 miles down the Yancey Hill; the survey and definite location have been carried to the Yellowstone River and to Tower Falls, and the two bridges for the Yellowstone and Lamar rivers have been contracted for.

In the lower Gardiner Canyon one bridge abutment has been put in, the spring rise preventing any further work until after it subsides.

On the eastern approach about 6 miles of road has been graded and the bridge over the Yellowstone has been about half built.

On the southern approach extensive repairs have been carried over the road from the Thumb to near Lewis River and material has been partly assembled for the Lewis River bridge.

Under general repairs and completion the road to the middle Gardiner Falls has been extended entirely around Bunsen Peak. The entire circuit of the belt line was opened before June 1, something never before accomplished in the history of the Park. The Natural Bridge cut-off has been built about 2 miles. The whole line of road from Mammoth Hot Springs to Golden Gate has been resurfaced. A very steep hill, called "Soap Hill," just below Fort Yellowstone has been cut out, replacing a 15 per cent grade with one of 8 per cent. The very dusty road across a portion of the Norris Geyser Basin formation has been entirely resurfaced. The Gibbon River branch of the western approach has been extensively improved. About 1½ miles of formation road near the Fountain Hotel have been resurfaced, and also about 2 miles of road in the Spring Creek Canyon. Besides these more important repairs the entire system has been gone over several times by small parties.

The improvement work is indebted to the acting superintendent of the Park for the use of quarters for certain employees, accommodations at outlying stations, the use of passenger transportation on two occasions, the loan of certain articles for use on the Golden Gate work, and the occasional use of saddle horses.

Nearly the entire road system of the Park was inspected by the Chief of Engineers between the dates of July 12 and July 18, 1900.

## REVISED STATEMENT OF MILEAGE OF YELLOWSTONE PARK ROAD SYSTEM.

At the date of submitting my last annual report the East road had not been fully located, and its mileage was not accurately known. It has been found to be considerably larger than estimated. By the act of March 3, 1901, the road system has been extended to include the Teton Forest Reserve, south of the Park, thus adding about 58 miles. In regard to the road from the Yellowstone River to Cooke City, it is considered best to classify that as a side road rather than as one of the approaches, as it is not likely in the near future to be used as an approach. Including the above modifications, the mileage of the Park road system is about as follows:

### APPROACHES.

| | Miles. |
|---|---|
| Northern: North boundary, near Gardiner to belt line at Mammoth Hot Springs | 5 |
| Eastern: East boundary, near Middle Creek to belt line near Yellowstone Lake outlet | 31 |
| East boundary of Park to east boundary of timber reserve | 28 |
| Western: West boundary, near Riverside to junction of the Gibbon and Firehole rivers | 14 |
| Junction of Gibbon and Firehole rivers, up the Firehole River to the belt line | 2 |
| Junction of Gibbon and Firehole rivers, up the Gibbon River to the belt line. | 4 |
| Southern: South boundary, near Snake River to belt line near West Thumb | 23 |
| South boundary of Park to south boundary of timber reserve | 10 |
| South boundary of Yellowstone Park Forest Reserve to mouth of Buffalo Fork in Teton Reserve | 19 |
| From mouth of Buffalo Fork to east boundary of Teton Reserve | 39 |
| From mouth of Buffalo Fork to south boundary of Teton Reserve | 15 |
| | 190 |
| In timber reserves | 111 |

### BELT LINE.

| | |
|---|---|
| Mammoth Hot Springs to Norris | 20 |
| Norris to Fountain | 20 |

| | *Miles.* |
|---|---|
| Fountain to Upper Basin | 9 |
| Upper Basin to West Thumb | 19 |
| West Thumb to Lake Outlet | 15 |
| Lake Outlet to Canyon Junction | 16 |
| (Canyon Junction to Canyon Hotel, 1 mile.) | |
| Canyon Junction to Tower Falls | 19 |
| Tower Falls to Mammoth Hot Springs | 24 |
| Canyon Junction to Norris (cross road) | 11 |
| | 153 |

SIDE ROADS.

| | Miles. | |
|---|---|---|
| At Mammoth Hot Springs: | | |
| Around Hot Springs Terraces | 1 | |
| To Osprey Falls and Bunsen Peak | 5 | |
| To Mount Everts ,via Undine Falls | 2 | |
| | | 8 |
| At Fountain: | | |
| To Great Fountain and Hot Springs | 3 | |
| Loop from mouth of Nez Perce Creek to Prismatic Lake | 4 | |
| | | 7 |
| At Upper Basin: | | |
| To Biscuit Basin | 1 | |
| To Iron Spring Creek and Black Sand Basin | 2 | |
| To Lone Star Geyser | 1 | |
| | | 4 |
| Lake Shore Road: Loop from near Bluff Point to near Natural Bridge | | 12 |
| River road: To Sulphur Mountain | | 3 |
| At Grand Canyon: | | |
| Along right bank of Grand Canyon | 3 | |
| To Inspiration Point | 3 | |
| | | 6 |
| Mount Washburn road: Loop from near Dunraven Pass over Mount Washburn. | | 7 |
| Lamar and Soda Butte road: From Belt line near Yanceys to Cooke City | | 27 |
| | | 74 |

SUMMARY.

| | | |
|---|---|---|
| Approaches in Park | 79 | |
| Approaches in Forest Reserve | 111 | |
| | | 190 |
| Belt line | | 153 |
| Side roads | | 74 |
| Total mileage of Park system | | 417 |
| Mileage opened June 30, 1901: | | |
| Approaches in Park | 58 | |
| Approaches in Forest Reserve | 64 | |
| Belt line | 104 | |
| Side roads | 47 | |
| | | 273 |
| Remaining to be opened: | | |
| Approaches in Park | 21 | |
| Approaches in Forest Reserve | 47 | |
| Belt line | 49 | |
| Side roads | 27 | |
| | | 144 |
| Total | | 417 |

## ESTIMATES FOR THE FISCAL YEAR 1902-3.

The appropriation for the current year (act of March 3, 1901), embodied all the more important recommendations in the annual report for the year 1900. The sum appropriated largely exceeded any former appropriation. It was made immediately available. It was in lump sum, thus giving more latitude in using it where most needed. It designated what proportion should be applied to works of improvement and what to administration and protection.

The advantage of these liberal provisions is already very apparent in the season's operations. More work has been accomplished at this date than is ordinarily done by the 1st of September. The appropriation will yield 20 per cent larger results, dollar for dollar, than has been possible under any previous appropriation. A continuance of this generous policy by Congress for a few more seasons will practically complete the project.

The existing project was approved by the Chief of Engineers August 27, 1900 (see Annual Report of Chief of Engineers, 1900, p. 5441), in compliance with the provisions of act of June 6, 1900, and after a personal inspection of the Park road system by the Chief of Engineers in July of that year.

The first column of figures in the following table gives the estimate of cost of completing the project at the time of its adoption; the second column gives the amount that will be required after the completion of the present season's operations, and the third column the amounts that should be appropriated for the fiscal year 1902-3, exclusive of the amounts for macadamization and for repairs and maintenance. The column of original estimates is increased in the item of the East road. The estimated distance at the time was 50 miles, but actual survey shows it to be about 60. The unit rate of $2,000 per mile gives an increase of $20,000:

| Description of work, 1902. | | Original estimate. | Remaining to be done. | Work that should be done season 1902. |
|---|---|---|---|---|
| 1. New road in Gardiner Canyon, including 3 steel bridges | | $10,000 | .......... | .......... |
| 2. Road through Golden Gate Canyon, including a new bridge to replace wooden bridge around cliff, and widening road along cliff, the latter all solid rock work | | 15,000 | .......... | .......... |
| 3. Raising 3 miles of road in Gibbon Canyon and cutting out 1 mile of dangerous grades; also opening 4 miles of new road down the Gibbon to connect with western approach | | 16,000 | $14,000 | $7,000 |
| 4. Completion of 8 miles of road near Fountain Hotel | | 8,000 | 7,000 | 5,000 |
| 5. Completion of southern approach along Snake River, 20 miles | | 30,000 | 20,000 | 10,000 |
| 6. New road from West Thumb to Natural Bridge, cutting out present line around lake shore, 8 miles | | 16,000 | 13,000 | 3,000 |
| 7. New road from Lake Outlet to east boundary of Forest Reserve, 60 miles, eastern approach, at $2,000 | | 120,000 | 75,000 | 25,000 |
| 8. Surfacing new road from Lake Hotel to Grand Canyon, 15 miles | | 15,000 | 15,000 | 10,000 |
| 9. New road down right bank of Grand Canyon, 3 miles | | 6,000 | 6,000 | .......... |
| 10. New road near Grand Canyon to cut out dangerous hills | | 5,000 | 5,000 | 5,000 |
| 11. New road, Canyon to Norris, 10 miles | | 20,000 | 20,000 | 10,000 |
| 12. New road, Grand Canyon, via Mount Washburn and Tower Falls to Mammoth Hot Springs, 40 miles | | 80,000 | 60,000 | 40,000 |
| 13. Completion of Cooke City road, 18 miles | | 15,000 | 15,000 | 5,000 |
| 14. Side roads and trails | | 9,000 | 5,000 | .......... |
| 15. New bridges not included in above estimate: | | | | |
| Yellowstone River, to replace Baronett Bridge | $10,000 | | | |
| Yellowstone River, near falls | 20,000 | | | |
| Yellowstone River, at Lake Outlet | 10,000 | | | |
| Lamar River, to replace existing bridge | 5,000 | | | |
| Pelican Creek | 3,000 | | | |
| Gibbon River, 2 bridges | 4,000 | | | |
| On Snake River road, 2 bridges | 6,000 | | | |
| Cascade Creek Bridge, near Grand Canyon | 5,000 | | | |
| Nez Perce Creek | 2,000 | | | |
| | | 65,000 | 45,000 | 35,000 |
| 16. New plant | | 5,000 | .......... | .......... |
| 17. New office and other buildings | | 10,000 | 10,000 | 10,000 |
| Total | | 445,000 | 310,000 | 165,000 |

The sum applied to the new work from the last two appropriations is $135,000 and represents the difference between columns 1 and 2 in the above table ($445,000–$310,000).

| | | |
|---|---|---|
| Act of June 6, 1900, appropriated | | $60,000 |
| Act of March 3, 1901, appropriated | | 118,000 |
| | | 178,000 |
| Administration and protection, seasons of 1900 and 1901 | $11,500 | |
| Annual maintenance and repairs, seasons of 1900 and 1901 | 31,500 | |
| | | 43,000 |
| | | 135,000 |

The annual repairs for the year 1902–3 must cover about 250 miles of road in the Park and reserves. At the usual rate of $100 per mile per year this amounts to $25,000, which is the estimate for maintenance for the next fiscal year.

The existing project upon which the foregoing estimates for new work are based did not include the macadamization of the roads, but only the securing of a correct grade, standard width of roadbed, good ditches, culverts, and bridges. It was expected to let the final surfacing remain to be done along with the current annual repairs, requiring for its completion many years to come. But the experience of the past three seasons has demonstrated that something must be done to abate the dust nuisance in summer and the mud nuisance in spring. In the matter of dust, the condition of the roads is undoubtedly becoming worse with increased travel[1] and is now so bad as to be a positive menace to the health of travelers.

The remedy for this condition lies mainly in thoroughly metaling the roadbed with crushed rock, or other equally good material. When the surface of the road is so hard that it will not cut up into ruts, the dust nuisance will be three-fourths abated. It is believed that the remaining dust can be mostly eliminated by sprinkling those portions of the main circuit and the principal approaches where the course of travel is with the prevailing wind.

The cost of metaling the roadbed depends, of course, upon the thoroughness with which it is done. To cover the road to its full width of 18 feet with an average thickness of 6 inches would require 1,760 cubic yards per mile. The average cost of the material as it runs in the Park—crushed rock, gravel, etc., will exceed $1 per yard in place, or will not be less than $2,000 per mile. On the principal roads, which are all that need be considered for the present, the distance traveled will be about 150 miles, and the total cost will be $300,000.

For the immediate needs of the public, however, about half of this work, placed only in the middle of the road, would produce great relief. Those portions of the route which are now in the worst condition, and in which an immediate remedy is imperative, comprise about 60 miles, and will require $60,000 for partial macadamization. This amount is added to the foregoing estimate for the next fiscal year.

The total cost of the new work remaining to be done, and that of macadamizing the principal roads, is thus $610,000. Of this amount the sums of $165,000 for new work and $60,000 for macadamization are asked for the next fiscal year, to which must be added $25,000 for maintenance and repairs—opening the roads in the spring, repairing culverts, ditches, washouts, bridges, etc., sprinkling certain portions of the roadway, and crowning up the roads before snow comes in the fall.

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[1] The increase for the present season over the travel heretofore will probably be not less than 50 per cent, judging from the record for the month of June.

The total sum required for the fiscal year 1902–3 is therefore $250,000.

For detailed description of each item of approved project see Annual Report, Chief of Engineers, 1900, pages 5410–5416.

### *Money statement.*

| | | |
|---|---|---|
| July 1, 1900, balance unexpended | | [1] $56,738.88 |
| Amount appropriated by sundry civil act approved March 3, 1901 | | 113,000.00 |
| | | 169,738.88 |
| June 30, 1901, amount expended during fiscal year | $81,572.26 | |
| Deduct refundment October 27, 1900, by Northern Pacific Railway Company | 17.85 | |
| | | 81,554.41 |
| July 1, 1901, balance unexpended | | 88,184.47 |
| July 1, 1901, outstanding liabilities | | 36,288.82 |
| July 1, 1901, balance available | | 51,895.65 |
| Amount (estimated) required for completion of existing project, in addition to the balance available July 1, 1901 | | 610,000.00 |
| Amount that can be profitably expended in fiscal year ending June 30, 1903: | | |
| For works of improvement | $225,000.00 | |
| For maintenance of improvement | 25,000.00 | |
| | | 250,000.00 |

APPROPRIATIONS.

| | Administration and protection. | Roads and bridges. | Total. |
|---|---|---|---|
| March 3, 1883 | $16,429.97 | $23,570.03 | $40,000.00 |
| July 7, 1884 | 16,999.98 | 23,000.02 | 40,000.00 |
| March 3, 1885 | 16,790.63 | 25,209.37 | 40,000.00 |
| July 15, 1886 | 934.25 | | 934.25 |
| August 4, 1886 | | 20,000.00 | 20,000.00 |
| March 3, 1887 | | 20,000.00 | 20,000.00 |
| October 2, 1888 | | 25,000.00 | 25,000.00 |
| March 2, 1889 | | 50,000.00 | 50,000.00 |
| August 30, 1890 | | 75,000.00 | 75,000.00 |
| March 3, 1891 | | 75,000.00 | 75,000.00 |
| August 5, 1892 | | 45,000.00 | 45,000.00 |
| March 3, 1893 | | 30,000.00 | 30,000.00 |
| August 18, 1894 | 10,565.24 | 89,434.76 | 30,000.00 |
| March 2, 1895 | | | 30,000.00 |
| June 8, 1896 | | | 5,000.00 |
| June 11, 1896 | | | 35,000.00 |
| June 4, 1897 | 6,736.74 | 28,263.26 | 35,000.00 |
| July 7, 1898 | 11,356.57 | 28,643.43 | 40,000.00 |
| March 3, 1899 | 5,534.64 | 34,465.36 | 40,000.00 |
| June 6, 1900 | 5,000.00 | 55,000.00 | 60,000.00 |
| March 3, 1901 | 5,000.00 | 113,000.00 | 118,000.00 |
| Total | 95,348.02 | 758,586.23 | 853,934.25 |

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[1] Increase of $8.66 over amount stated in the 1900 report, explained as follows: Refundment of $6.50 by Capt. H. M. Chittenden, United States Army, October 18, 1900; refundment of $2.16 by Capt. H. M. Chittenden, United States Army, November 16, 1900.

*List of civilian engineers employed on works of improvement in Yellowstone National Park, Wyoming, from July 1, 1900, to June 30, 1901.*

| Name and residence. | Time employed. | Compensation per month. | Where employed. |
|---|---|---|---|
| | *Months.* | | |
| S. F. Crecelius, Sioux City, Iowa | 11 | $150 | Yellowstone National Park. |
| C. E. Sherman, Columbus, Ohio | $2\frac{15}{30}$ | 150 | Do. |
| Edwin D. Vincent, Sioux City, Iowa | 2 | 150 | Do. |
| I. Milton Fowble, St. Paul, Minn | $1\frac{16}{30}$ | 150 | Do. |

## APPENDIX A.

### REPORT OF MR. C. E. SHERMAN, ASSISTANT ENGINEER.

COLUMBUS, OHIO, *February 25, 1901.*

CAPTAIN: I have the honor to submit the following report of work done under my supervision during the summer of 1900 in Yellowstone Park.

I reported for duty at Mammoth Hot Springs Monday, July 9, and immediately assumed charge of the work of improvement of the wagon road through Glen Creek Canyon, from the Golden Gate to Rustic Falls. This work consisted in widening the roadway and cutting down its steeper grades between the points mentioned above, and in constructing a concrete viaduct to replace this old and dangerous wooden structure at the Golden Gate.

After establishing camp on the plateau just above the canyon, the next few days were spent in definitely locating the piers, center line, and grade line of the viaduct, and in setting stakes for the road improvement. A party of about 35 men and foreman began on this latter work on the 12th and it was prosecuted vigorously until the beginning of the work on the viaduct, after which the two works were carried on simultaneously. The existing road was difficult and dangerous—difficult in having steep grades, and dangerous because of sharp turns, one at the foot of and partly on a steep grade. The roadway through the canyon lies on a bench about 15 feet wide, in the face of the north wall, which is of volcanic trachite, and all new grading, therefore, was in solid rock. To widen the roadway, if not done by blasting into the cliff on the inside, required the building of a high retaining wall on the outer edge of the road. The expense of doing this and of constructing the viaduct prevented the completion of the entire improvement; but one of the two steep grades has been reduced and the most dangerous turn has been widened. The remaining work can be done at small expense. When completed, the whole road from and including the bridge to Rustic Falls will have been reduced to an 8 per cent grade. Two former stretches had gradients of 15 and 18 per cent respectively. (See accompanying profile.[1])

Pending the arrival of the lumber and cement for the work on the viaduct a foreman and crew of carpenters began the construction of a flume for washing sand and gravel for the concrete. This was thought to be necessary for the material at that time available, but before work on the flume had progressed very far it was rendered unnecessary by the discovery of a fairly clean bed of sand and gravel on Swan Lake Flat, three-fourths of a mile distant from the work. This bed was under an old gravel pit, used for obtaining road metal, and was covered with from 3 to 4 feet of loamy gravel, the cleanest and best material coming from a depth of about 10 feet below the natural surface of the ground. The flume, if built, would have been 1,200 feet long, carrying the water from Rustic Falls to the viaduct, and together with the added expense of extra handling of the material in washing would have cost approximately $600, or would have added about $1 per cubic yard to the cost of the sand and gravel used in the work. However, some extra expense was incurred at the pit in screening the gravel to secure proper proportions of sand and in extra work necessary to obtain clean gravel. This last was caused by the peculiar manner in which the material occurred in the pit. Layers of loamy gravel were mingled with strata of sharp, clean, coarse sand in strange inconformity. The only other material available was in the pit at Observatory Hill, nearly 4 miles down the hill toward Mammoth Hot Springs and 1,000 feet lower in altitude, where much stripping would also have been done to secure suitable material.

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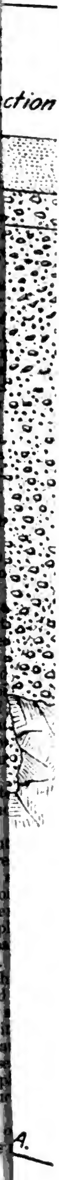
[1] Not printed.



On July 28 the major part of the force was put at work preparing the Sno
road for travel during the construction of the Golden Gate Bridge. At first
intended to provide for travel over the bridge during construction, but later th
found to be impracticable with the time and funds available. The work on the
Pass road consisted of widening the way where turning-out places were n
clearing it of rocks and fallen trees, and reducing the dangerously steep grades,
necessitated heavy side-hill cuttings in some places and the building of about
of new road. After travel was turned upon it the surface soon pulverized
stifling alkaline dust in places, rendering tourist travel extremely disagreeabl
this account work on the new viaduct, when begun, had to be pushed with all p
speed.

Travel was turned off the Golden Gate road on the morning of August 6, w
foreman and crew of carpenters began tearing down the old bridge. On M
morning, September 2, just four weeks later, the new bridge was opened for g
travel, the concreting having been completed three days previously.

The work of tearing down the old bridge and the erection of forming for th
crete was skillfully supervised by Mr. Robert Walker, foreman of the carpenter
The forming lumber consisted of 6 by 6 inch posts, or uprights, and 2-inch she
of Oregon fir, ordered from Presscott, Vaness & Co., of Winlock, Wash., at $
M at the mill, and cost delivered at the work $17.64 per M. The work of b
the forming followed up the tearing down of the old bridge, which was u
storing materials so long as any of it remained. As a place was made for ea
the loose rock and dirt was cleared away and horizontal steps cut in the r
afford secure footing for the concrete. Uprights were then raised, braced
bottom by shores against the projecting rock and at the top by iron rods, hook
eyebolts cemented into the solid rock, and by stay lath to the top of the pr
pier. The pier and arch sheathing completed a span. The center line of ea
is normal to the center line of bridge, which is curved to a radius of 565 fee
general shape of each pier on a vertical section normal to the above center
approximately triangular, right-angled at the upper outer corner, the hypot
consisting of a series of steps in the face of the cliff.

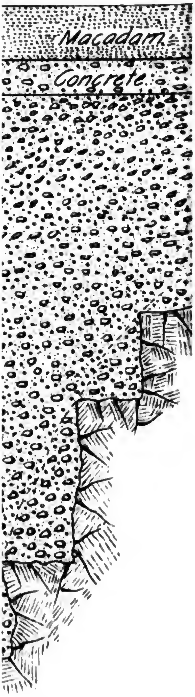
The viaduct consists of eleven arches resting on the two abutments, and te
the whole being on an 8 per cent grade, and on a 10-degree curve. (See accom
ing photographs and drawing.) The radius of the outside of parapet wall
feet. The length on center line is 200 feet and the abutment wing walls ext
feet farther at each end. The arches are terminated at their inner extremi
the irregular and nearly perpendicular face of the cliff, leaving a roadway av
about 18 feet in width; minimum width, 15 feet. The piers are spaced 18 feet
to center on the outside and converge 6¼ inches in 18 feet, the average wi
roadway. They are 3 feet thick. The arches are 18 inches thick on the p
inches at the crown, and have 24 inches rise. Piers and arches are built o
Portland cement concrete, the former in proportion of 1, 2 and 4 and the la
proportion of 1, 2 and 3. In the crown of each arch is embedded a piece o
netting 7 by 15 feet, made of No. 8 Birmingham gauge wire, meshes 2½ by 5 i
the long dimensions of mesh and short dimension of the piece of netting
parallel to center line of bridge. The piers rest upon horizontal surfaces s
into the solid rock, and where these footings are separated by surfaces in
much from the vertical anchor bolts were embedded in them.

Work was begun at the west or highest end of the bridge. The west abu
and the piers were all concreted before the arches were begun, and these were
put in alternately. Each arch and corresponding parapet wall was put in
same time as one piece, the section being limited by the vertical planes upo
radial center line of each pier. The joints thus formed afford the necessary e
sion cracks, the opening and closing of which could be observed at the compl
of the bridge. Railroad iron in 4-foot lengths was embedded in arch and pa
wall, four pieces to each arch, to strengthen the connection between the two.
valleys between each arch incline to the inner edge of roadway where 2-inch
pipes are inserted for weep holes. In addition to the heavy abutment and
wall at the lower or eastern end of the bridge, the irregularities of the cliff
inner edge of the roadway, into which the arches are keyed, afford an addit
precaution against the sliding of the arches upon the piers downhill by expa
and contraction. Each section of parapet wall was keyed into the adjoining se
by a vertical 2 by 6 inches tongue and groove extending from the top of the p
the under side of the rail of wall, so that it does not show in the finished struc

I give below some details regarding the making of the concrete:

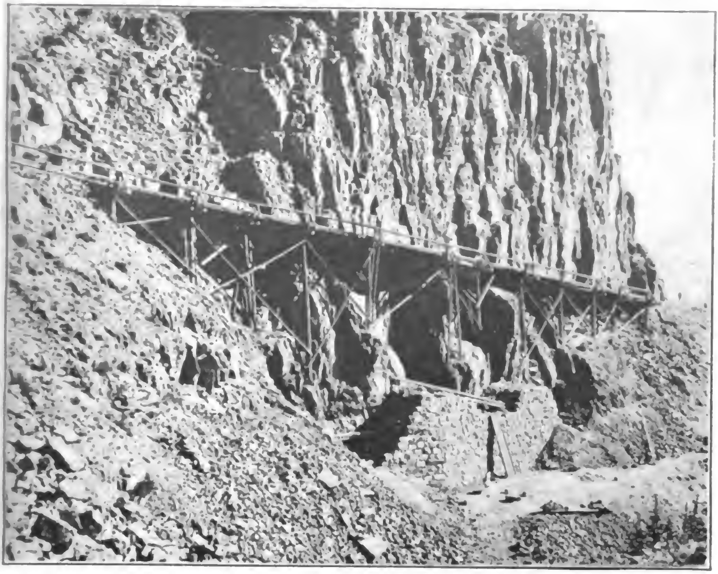
A sand and gravel bin 8 feet wide by 60 feet long was built on the outer side o
roadway near the west end of the bridge. This was as large a one as there was

tion at center c



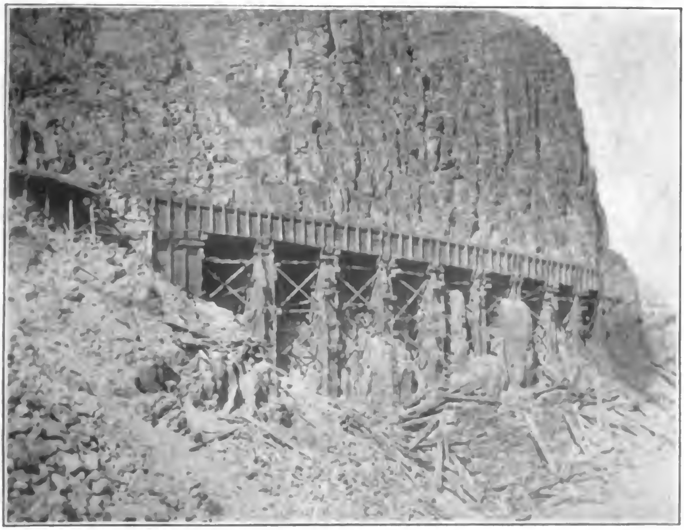
A.

No. 1.



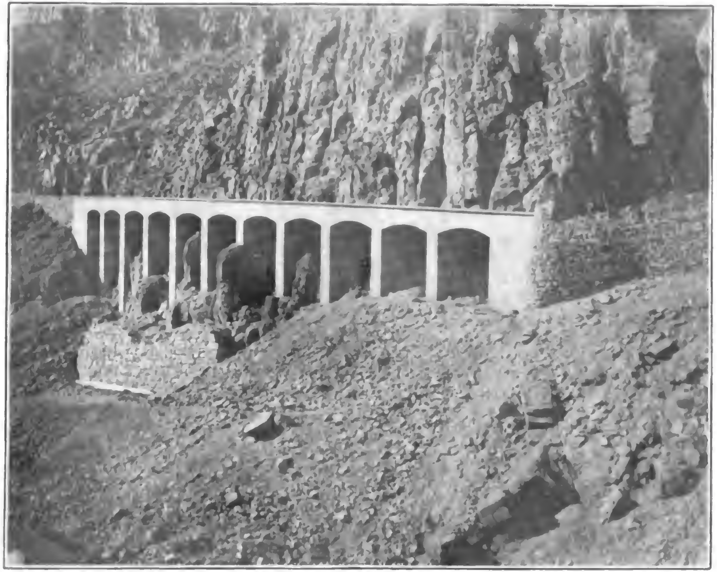
OLD GOLDEN GATE VIADUCT.

No. 5.



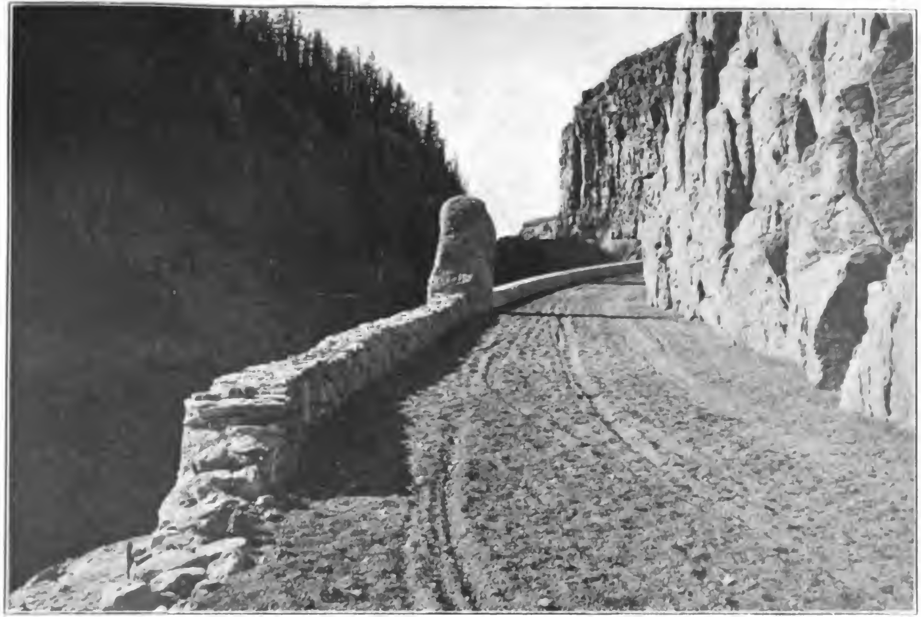
ERECTION OF GOLDEN GATE VIADUCT. FORMING FOR ARCHES COMPLETE.

No. 7.



ERECTION OF GOLDEN GATE VIADUCT. SIDE VIEW OF COMPLETED WORK.

No. 9



ERECTION OF GOLDEN GATE VIADUCT. TOP VIEW OF COMPLETED WORK FROM ROAD BELOW VIADUCT.

for. It was open at both ends to allow wagons to be driven in and emptied by dump boards, and at the end next the bridge a platform was built overhanging the declivity to make a turning place for the empty gravel and water wagons. During the middle of the day a high wind was generally blowing through the canyon, and to avoid the necessity of work at this time, concreting was begun as soon after daylight as possible with all available force, continuing all day if conditions were favorable, but quitting with the completion of a predetermined amount if the wind came up too strong. In this way each pier and arch were made monoliths. Owing to the cramped space, to prevent interference with the gravel carts supplying the mixing boards, it was found best to run the gravel wagons in the afternoon and evening after the concreting for the day was done. The water wagon was also kept running at the same time, filling all the barrels there was room for, and running next day during the concreting if necessary, which was usually the case.

Two handcarts, each of half a cubic yard capacity, were used to move the sand and gravel from bin to mixing boards. The proportions of sand and gravel were regulated at the bin, a foreman being in constant charge. One, two, or three mixing boards 8 by 12 feet were used, as many as space permitted; six men to each board in shifts of three. The mixture was turned by shovels once dry, three times wet, then shoveled into the forming, and spread and tamped in 6-inch layers by as many tampers as could conveniently work in the inclosure. In filling in the bottoms of the deep piers the concrete was put in and tamped in layers of 1½ feet thickness; with a drop of 25 to 40 feet, together with the wet mixture employed, it was thought this would suffice. Most of the concrete was put in so wet as to quake after being tamped a minute or so; the arches were put in drier. The material was mixed in batches of six-tenths cubic yard per batch. The narrow space would not allow larger boards. In concreting the arches the haunches were first filled in 12 inches and the crown 4 inches, then the wire netting was put in place and the arch and rail completed.

Some of the difficulties encountered in this work are as follows:

1. Owing to the high wind usually prevailing the work of concreting was carried on under the most trying conditions, dust and cement filling eyes and lungs of workmen in spite of goggles and kerchiefs. On this account men kept constantly quitting, notwithstanding increased pay for concrete work, their places being filled by new and inexperienced men. Of the original force which began the work few were working at its completion, although a nearly uniform number was maintained by new recruits. The total number of men employed in connection with the work was 91, but the average force available was much less than this. The actual time spent by the force in concreting was 122 hours on 19 different days.

2. Owing to the complicated shape of the forming on the face of the cliff the cost of its erection was more than ordinary. It must be remembered, however, that this item includes tearing down the old bridge.

3. Lack of storing space near at hand increased the cost of handling all materials.

4. Labor and subsistence are probably as high here as in any part of the United States. Ordinary labor is paid for at $1.50 per day, of eight hours, and subsistence. This latter costs about 35 cents per day per man. All laborers while making concrete received 25 cents per hour.

5. Transportation rates are high. The rate from Cinnabar, the railroad terminus, to the Golden Gate, a distance of over 11 miles, is 28¾ cents per ton-mile.

6. A suitable sand and gravel for concrete is difficult to obtain. Of the money spent for this material, half was spent in exploring and stripping before it was made accessible.

On this last point developed an interesting question. What percentage of loam in sand will materially affect the strength of concrete? In the piers some material was used which contained 7 per cent (by volume, or less than 5 per cent by weight) of loam. Better material could have been obtained only at greatly increased cost. In the arches no material used contained over 2 per cent of loam. The percentages were obtained by washing samples in a bucket of water, pouring off and evaporating the matter in suspension while thoroughly agitated.

The only information I have been able to find on this point are the experiments made by Mr. E. C. Clarke. In Mr. Clarke's test, sand containing 10 per cent of loam was used in the place of clean sand. Although his tests were not very decisive they indicated that for one week and one month the breaking loads are not much more than one-half what would have been expected with clean sand, but for six months and a year they are fully equal to ordinary mortar. These tests were made with Rosendale cement.

In some other tests conducted by the same authority clay was substituted for loam and Portland cement used, and the results obtained from breaking about 350 briquets seemed to show that the presence of clay in moderate quantities does not weaken cement mortars. These tests extended over a period of one year, and some additional tests, carried on for two and one-half years to test the subject of weathering, showed that clay had little or no effect on the weathering qualities of cement mortar. (See transactions of American Society of Civil Engineers, Vol. XIV, p. 163.)

### *Statement of cost.*

#### GROSS COST.

| | |
|---|---|
| Snow Pass road | $530.00 |
| Golden Gate road | 1,682.00 |
| Golden Gate viaduct | 8,904.33 |
| | 11,116.33 |
| Office and miscellaneous | 1,385.50 |
| Total | 12,501.83 |

Under each of the above items is included the cost of superintendence and all necessary subsistence for labor while completing the work. The cost of 545 yards of concrete was about $16.34 per yard, not a high figure when the difficulties of the situation are taken into account.

The following is a more detailed statement of the above:

| | |
|---|---|
| Snow Pass road: | |
| Labor and teams | $400.00 |
| Superintendence | 20.00 |
| Subsistence | 80.00 |
| Proportion of cook's wages | 30.00 |
| | 530.00 |
| Golden Gate road: | |
| Labor and teams | 1,072.00 |
| Superintendence | 130.00 |
| Subsistence | 265.00 |
| Powder | 75.00 |
| Portion of cook's wages, etc | 90.00 |
| Engineering | 50.00 |
| | 1,682.00 |
| Sand and gravel for concrete: | |
| Flume lumber (afterwards used for bins, etc.) | 50.00 |
| Labor on flume | 68.00 |
| Screening stage at gravel pit and bins | 100.00 |
| Stripping gravel pit | 195.00 |
| Screening and hauling sand gravel | 100.00 |
| Subsistence | 118.00 |
| Proportion of cook's wages | 30.00 |
| | 661.00 |
| Erection of forming and tearing down old bridge: | |
| Excavating, cleaning, and drilling | 111.39 |
| Carpenters and laborers | 831.00 |
| Bill of lumber | 933.04 |
| Superintendence (overseer's wages) | 175.00 |
| Subsistence | 195.00 |
| Proportion of cook's wages, etc | 60.00 |
| | 2,305.43 |

| Manufacturing concrete: | |
|---|---|
| 640 barrels of cement, at $4.65 on work | $3,174.90 |
| Labor | 1,633.00 |
| Superintendence | 90.00 |
| Subsistence | 450.00 |
| Proportion of cook's wages, etc | 90.00 |
| Engineering | 500.00 |
| | 5,937.90 |

Very respectfully, your obedient servant,

C. E. SHERMAN,
*Assistant Engineer.*

Capt. H. M. CHITTENDEN,
*Corps of Engineers, U. S. A., Sioux City, Iowa.*

## APPENDIX B.

### REPORT OF MR. S. F. CRECELIUS, ASSISTANT ENGINEER.

MAMMOTH HOT SPRINGS, WYO., *June 30, 1901.*

CAPTAIN: I have the honor to make the following report upon the location and construction of a part of the proposed road from the outlet of Yellowstone Lake to the east boundary of the Yellowstone Park Forest Reserve, provided for by acts of Congress approved June 6, 1900, and March 3, 1901:

### OPERATIONS OF SEASON OF 1900.

A reconnaissance was made covering Jones, Crow, and Sylvan passes, which are all the passes through which reasonably direct routes are possible. Sylvan Pass was found to be 1,000 feet lower than the other passes, it being but 8,500 feet above sea level. This route was finally adopted for the road location and the work of location and construction was commenced on July 5, 1900.

### LOCATION.

The location has been completed to Sylvan Pass and is as follows:

A ferry site was chosen for the Yellowstone River one-fourth mile below the lake, but later it was decided to build a bridge at this place. From this point the location continued in an easterly direction, crossing Pelican Creek about one-fourth mile above its mouth, thence to Indian Pond, which is passed on the east side. From this place the road runs in a southerly direction to Turbid Lake, which it strikes at its outlet. The outlet is crossed close to the lake and the line continues along the west side of the lake gradually rising as it turns around its south end. From this point the road goes south along the top of the ridge west of Bear Creek and passes through the saddle just east of Lake Butte, thence in an easterly direction passing on the north side of the pond about 1 mile east of Lake Butte and continuing in this general direction to the crossing of Cub Creek.

From this point the line rises on a grade of about 6 per cent in order to cross the point of the ridge between Cub and Clear creeks without making a great detour. After crossing this point the line takes a southerly direction and descends to Sylvan Lake on a light grade. The line follows the north side of the canyon from the lake to Sylvan Pass.

From Sylvan Pass to the Shoshone River a preliminary location was made as follows:

The location is on the north side of the canyon for about 3.1 miles east of Sylvan Pass and then crosses Middle Creek and stays on the south side for about 1¼ miles, recrossing Middle Creek at the first large fork coming in from the south. It is possible that the location from the pass to the fork of Middle Creek can be improved by using slightly heavier grades and remaining on the north side of Middle Creek. This matter will be investigated. From the forks the line continues down the north bank of Middle Creek for 2¾ miles. This location may be considered as final. From this point a preliminary line was blazed to the junction of Middle Creek with the Shoshone River, a distance of 3½ miles.

The location from the junction of Middle Creek and the Shoshone River to the east boundary of the Forest Reserve was hastily made, but it may be regarded as final, for such changes as may be found desirable will be slight. A bridge site was chosen over the Shoshone River just above the mouth of Middle Creek, and from this bridge site the line runs down the left bank of the Shoshone River for about 20 miles, and a bridge site was chosen where the river leaves the right bank bluff just above Wapiti Creek. The line stays on the right bank for about 4 miles, where another bridge site was chosen at a point where the river leaves the bluff on the left bank. The line stays on the left bank from here to the Forest Reserve boundary, where another bridge site was chosen. The total length of line is 56 miles.

### CLEARING AND GRUBBING.

A clearing 30 feet wide was made from Yellowstone Lake outlet to a point three-fourths of a mile from the crossing of Cub Creek, a distance of 12.3 miles. Where it was practicable all timber was taken out of sight of the roadway. The total area cleared was 41 acres.

### GRADING.

The grading is practically completed from the Yellowstone Lake outlet to Indian Pond and from one-fourth mile west of Turbid Lake to the top of the ridge south of the lake, and a passable road was built from this point to the end of the clearing. The total distance completed was 4.1 miles. The total length of passable road, including completed portion, is 9.6 miles.

The grading includes the building of a causeway across Pelican Flat 1,500 feet long, 18 feet wide, and 3½ feet high, and also an approach to Yellowstone River 500 feet long, 18 feet wide, and 4 feet high. Both of these grades were cribbed to the top.

### CONTRACT GRADING.

A contract was made for the grading of 2.7 miles of road between Indian Pond and Turbid Lake containing 18,580 cubic yards of earth. Work is progressing slowly and unsatisfactorily on this stretch of road, but it is expected that it will be completed during the coming month.

### FERRY APPROACHES AT YELLOWSTONE RIVER.

Pile and timber approaches were built at the ferry landings extending from 2 feet above high water to 2 feet below low water and on a 20 per cent grade.

The approaches were built pointing downstream at an angle of 3° to the normal to the current. One hundred and six piles were driven at this place.

### BRIDGES.

Piles were driven for a pile bent bridge over Pelican Creek. There are 10 bents of 5 piles each. This bridge was not completed.

A bridge was built over Turbid Lake outlet close to the lake. This bridge is 40 feet long and is supported by a low bent built on a mud sill placed in mid-channel. The abutments are cribs built close and backed with earth.

Work is now progressing on a pile bent bridge which is to replace the ferry over the Yellowstone River, and it will be completed in about ten days. The length of this bridge is 347 feet, and it is built on earth abutments and 20 piles bent of 5 piles each. The piles now driven have an average penetration of about 7 feet.

### WORKING SEASON.

Work was suspended on October 31, 1900, and was not resumed until June 1, 1901.

Very respectfully, your obedient servant,

S. F. CRECELIUS,
*Assistant Engineer.*

Capt. HIRAM M. CHITTENDEN,
*Corps of Engineers, U. S. A.*

## APPENDIX C.

### REPORT OF MR. A. E. BURNS, OVERSEER.

MAMMOTH HOT SPRINGS, WYO.,
*June 30, 1901.*

CAPTAIN: I have the honor to submit the following report of general repairs to roads and bridges and the construction of side roads in the Yellowstone National Park during the fiscal year ending June 30, 1901:

### GENERAL REPAIRS.

During the months of March and April, 1900, a small force was employed clearing ice and snow from the roadbed, opening culverts and ditches, and removing rock and earth slides between the north entrance to the Park at Gardiner and the Mammoth Hot Springs. This work was continued with a slightly increased force during May. The amount expended was $410.25.

At the beginning of June the party was enlarged and executed similar repairs on the roads between Mammoth Hot Springs and Undine Falls.

This crew was then moved to the lake outlet, en route to which point it thoroughly repaired all roads, redecked bridges and culverts, mended retaining walls, and crowned the road surface with a grading machine. The road along the brink of the Grand Canyon was carefully examined and renovated. All bridle trails were cleared, leveled, and in places widened. The retaining walls, guard rails, and fences were inspected and strengthened where necessary. A quantity of dead timber, both standing and fallen, was removed from various observation points in the vicinity where it obstructed or marred the view. On arrival at the lake outlet the crew was enlarged and commenced construction work on the road to the east boundary. Amount expended in general repairs Mammoth Hot Springs to Undine Falls and Mammoth Hot Springs to lake outlet, $1,029.80.

On June 14 a party was organized, equipped as a repair crew, and commenced work at Norris, thoroughly repairing the main road and all side roads between that point and the West Thumb, via the Fountain and Upper Basin. The work done by this party was similar to that already described. A sidewalk was also built over portions of the Norris Geyser Basin, and railings were erected around several of the boiling pools near the road.

A wagon trail was constructed, for the convenience of tourists who wish to drive around a portion of the Upper Geyser Basin, from a point on the main road near the Castle Geyser to Iron Spring Creek, the Punch Bowl, and Black Sand Basin, joining the main road again near the Grotto Geyser. The crew then commenced reconstruction work between the Upper Basin and the West Thumb.

Amount expended, general repairs Norris to West Thumb via Fountain and Upper Basin, $1,494.05.

On July 3 a small party started to patrol the entire road circuit. It worked until August 30, repairing bridges, culverts, guard rails, platforms, and fences. Total cost, $80.97.

On the 1st of September it was sent over the road to the west boundary, where it executed all necessary repairs to the roadbed, bridges, and culverts, and returned to headquarters on the 14th. Cost of work, $220.20.

On the 15th of September the same crew commenced work over the road between Mammoth Hot Springs and Soda Butte, which was slightly repaired in its worst places. Two carpenters were afterwards added, and the Baronett Bridge crossing the Yellowstone near Yanceys was repaired. Cost of work, $140.27.

At the close of the tourist season on September 15 a party was started with road-grading machines to crown the surface of the roads over the entire circuit and place them in the best possible condition to withstand snow and frost and the action of the melting snows during the ensuing spring. Cost of work, $982.66.

The erection of suitable sheds for the storage of property and necessary repairs to the buildings at headquarters cost $160.85.

Total amount expended for repairs to and general maintenance of roads and bridges:

| | |
|---|---|
| Appropriation 1898 and 1899 | $687.55 |
| Appropriation 1899 and 1900 | 4,631.50 |
| Office and superintendence | 969.05 |
| | 6,288.10 |

### CONSTRUCTION.

A road to be used by light vehicles was built from a point on the circuit near the south end of Golden Gate around the south base of Bunsen Peak to Osprey Falls on the Gardiner River. Cost, $652.90.

A similar road, on which much less work was expended, was opened from a point near Undine Falls on the Gardiner River to the summit of Mount Everts. It is still uncompleted and affords only rough traveling, but may be driven over with safety. Cost, $135.52.

A road was opened, for the convenience of tourists entering the park by the west boundary, from a point on the road circuit near the junction of the Gibbon and Firehole rivers, up the north bank of the Gibbon to a point midway between Norris and the Fountain. It crossed the river and joined the main road on the north bank. Though not completed, there was considerable travel over it, as it shortened the road to the boundary by about 3 miles. Cost, $1,193.25.

Total cost construction, $1,981.68.

### RECONSTRUCTION.

The worst portions of the road between the Upper Basin and the West Thumb, which had hitherto been in very poor condition, owing to the loose sandy nature of the material of which they were constructed, were greatly improved by surfacing.

At various points on the road where proper material was found pits were opened and good gravel was hauled and spread over a previously laid layer of coarser ballasting. This work has proved itself to be a complete success and has greatly improved that portion of the road system. Total cost reconstruction, $2,474.85.

Very respectfully, your obedient servant,

A. E. BURNS,
*Overseer.*

Capt. HIRAM M. CHITTENDEN,
*Corps of Engineers, U. S. A.*

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## APPENDIX D.

### SUPPLEMENTARY REPORT OF MR. A. E. BURNS, OVERSEER.

On April 1, 1901, preparations were made to commence work with a large force, but a continuance of stormy weather prevented any further operations being undertaken.

The plant was thoroughly overhauled, all implements and tools were examined and repaired where necessary, and the camp equipment was placed in proper condition for the season's work.

On April 1 a few men were employed cleaning the road from the north entrance of the Park to Golden Gate. During the month more men and teams were put to work, as occasion required, on the usual spring repairs.

On April 24 a crew was organized to finish the improvements near Golden Gate. After completing this work it was moved to the new road on the east boundary and started construction.

Two small section crews were put in the field on May 11 and another May 15. A small party was detached from the latter to open the road over the Continental Divide between the Upper Basin and the Yellowstone Lake.

The road from the West Thumb to the south boundary was traversed by a small repair party which opened it for travel, while another small party did similar work over the road to the northeast boundary, near Cooke City.

The road from Mammoth Hot Springs to Golden Gate was improved by straightening some of the curves, improving the grade, and surfacing its entire length with carefully selected gravel.

Near Norris some hitherto particularly dusty stretches of road were surfaced. Similar work was undertaken on the new road to the west boundary, two bad pieces near the Fountain Hotel, and the road through Spring Creek Canyon.

On May 22 the sawmill, which had previously been thoroughly overhauled and repaired, was moved to a point near the lake outlet where the first setting was made to cut lumber for the construction and repairs of bridges and culverts.

A fourth section crew commenced operations between Mammoth Hot Springs and Norris on May 24.

The roads crossing the plateau of the Mammoth Hot Springs were resurfaced and all sidewalks and crossings were repaired.

Water tanks and small storage reservoirs were constructed at intervals of about hree-fourths of a mile on the road between Mammoth Hot Springs and Golden Gate, and on June 24 the work of sprinkling the road surface daily was commenced.

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## Appendix E.

### MODIFICATION OF GENERAL PLAN OF ROADS AND IMPROVEMENTS FOR YELLOWSTONE NATIONAL PARK, APPROVED BY THE SECRETARY OF WAR, PREPARED IN PURSUANCE OF ACT OF CONGRESS APPROVED JUNE 6, 1900.

Improvement Yellowstone National Park,
United States Engineer Office,
*Mammoth Hot Springs, Wyo., July 2, 1901.*

General: Under date of August 27, 1900, the Chief of Engineers approved a general plan for road extension and improvements in the Yellowstone National Park, n accordance with the requirements of the act of June 6, 1900. The project as approved contained the following statement:

"The present project and estimates do not contemplate the macadamization of the roads. While this will come in time, it will probably be done along with the current annual repairs, and its completion will be a matter of many years to come."

The condition of the road in the matter of dust is such that it now appears necessary to ask for some immediate relief. During portions of the dry season the dust is such as to amount to a positive menace to the health of travelers. The roads are constantly becoming worse in this respect as travel increases. They are composed for the most part only of the the ordinary soil through which they pass. It will be necessary that they be thoroughly metaled with crushed rock, gravel, or other good material. This will eliminate fully three-fourths of the dust. Based upon a trial now being made, it is believed that the rest of the dust annoyance can be gotten rid of at moderate cost by sprinkling those parts of the roadway where the regular travel is with the prevailing wind.

The Hon. Joseph G. Cannon, chairman of the House Committee on Appropriations, by whom the estimates for the Park work are acted upon, has just made a tour of inspection of the existing road system and of the proposed new work. At his urgent request, I have the honor to recommend that the existing general project (August 27, 1900) be so amended as to include the macadamization of 150 miles of the most important roads. The estimated cost is $2,000 per mile.

This work was not included in the general project, because experience in securing funds for the Park improvement hitherto seemed to preclude the possibility of getting money to do the work with, at least in the near future. But as the actual situation has become of late more thoroughly understood, there is every prospect that the necessary funds will be forthcoming.

The above estimate will be included in my annual report of this date, with a request that a certain portion be appropriated for the ensuing fiscal year.

Very respectfully, your obedient servant,

H. M. Chittenden,
*Captain, Corps of Engineers.*

Brig. Gen. G. L. Gillespie,
*Chief of Engineers, U. S. A.*

[First indorsement.]

OFFICE CHIEF OF ENGINEERS,
U. S. ARMY,
*July 9, 19*

Respectfully submitted to the Secretary of War.

The paragraph in the sundry civil appropriation act approved June 6, 1900,
ing appropriation for the improvement of the Yellowstone National Park, co
the following proviso: "That road extensions and improvements shall hereaf
made in said park under and in harmony with a general plan of roads and imp
ments to be approved by the Chief of Engineers of the Army."

In pursuance of this requirement of the act of Congress cited, Captain Chitten
August 20, 1900, submitted a general plan for road extensions and improvements
Park, which is inclosed herewith. This general plan was approved by the C
Engineers on August 27, 1900, subject to such minor changes as may become
sary from time to time in the progress of the work. The general plan of im
ment and the approval thereof by the Chief of Engineers were printed in the
Report of the Chief of Engineers for 1900.

As stated within, this general plan as approved states that the present proj
estimates do not contemplate the macadamization of the roads.

The main portion of the road system is known as the belt line or general
which passes or is to pass through all the more important centers of interes
Park, and on which the hotels for the accommodation of visitors are located
belt line comprises a total mileage of about 153 miles. Practically all visitors
Park pass over the belt line, and as travel increases the dust nuisance grows
This has now reached a point where it appears to be imperatively necessary t
remedial measures.

If there be no objection, it is proposed to so modify this approved general
to provide for the macadamization of the belt line of roads, and it is further p
to submit with the next annual estimates an item for an appropriation for th
mencement of the work of macadamization.

It is not proposed at this time to enter upon the macadamization of the app
from the boundaries to the belt line, except from the north, or of the side ro
trails.

A. MACKENZIE
*Acting Chief of Engi*

[Second indorsement.]

WAR DEPARTMENT, *July 22,*

Approved as recommended by the Acting Chief of Engineers.

E. ROOT
*Secretary of*

# APPENDIX G G G.

## RECONNAISSANCES, EXPLORATIONS, AND WORK IN THE FIELD, IN MILITARY DIVISIONS AND DEPARTMENTS.

## G G G 1.

## EXPLORATIONS AND SURVEYS IN THE DEPARTMENT OF THE COLUMBIA.

*REPORT OF LIEUT. COL. W. V. RICHARDS, SEVENTH INFANTRY, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

ENGINEER OFFICE,
HEADQUARTERS, DEPARTMENT OF THE COLUMBIA,
*Vancouver Barracks, Wash., July 1, 1901.*

GENERAL: I have the honor to submit the following report of the operations of the engineer office, Department of the Columbia, for the year ending June 30, 1901:

From July 1, 1900, to February 1, 1901, there was no clerk in the office.

### FIELD WORK.

A survey was made for a railroad that was projected to run through Vancouver Barracks, Wash. The object of the survey was to show the feasibility of running the road in a part of the reservation which would be less detrimental to the post than the route surveyed by the railroad company.

### OFFICE WORK.

The office work has consisted in the preparation of maps, plans, etc., as follows:

Map and tracing of the proposed change in route of the railroad through Vancouver Barracks, Wash.

Tracing of military reservation at Fort Lawton, Wash.

Tracing of military reservation at Fort Columbia, Wash.

Profile of water-supply pipes at Fort Liscum, Alaska.

The map showing the location of sewers and water-supply pipes at Vancouver Barracks has been revised and corrected up to date.

An estimate was made of the cost of repairs of the reservoir at this post.

Map mounting, solar printing, and other routine work pertaining to this office has been done as follows:

| | |
|---|---|
| Solar prints | 11 |
| Maps mounted on muslin | 10 |
| Maps issued | 4 |

In addition to the above, work pertaining to the Adjutant-General Office has been done in this office.

Very respectfully,

W. V. Richards,
*Lieutenant-Colonel, Seventh Infantry,*
*Engineer Officer.*

Brig. Gen. G. L. Gillespie,
*Chief of Engineers, U. S. A.*

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## GGG 2.

### EXPLORATIONS AND SURVEYS IN THE DEPARTMENT OF CALIFORN

### *ANNUAL REPORT OF LIEUT. JAMES F. McKINLEY, ELEVENTH CA ALRY, AID, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

Engineer Office,
Headquarters, Department of California,
*San Francisco, Cal., July 16, 1901.*

Sir: I have the honor to make the following report of operatio for the year ending June 30, 1901:

Capt. A. B. Dyer, Artillery Corps, U. S. A., was acting engine officer at these headquarters from the date of the last annual rep until July 1, 1901, when, under the provisions of paragraph 3, General Orders, No. 14, Headquarters, Department of California, curre series, he was relieved from that duty and I assumed charge of th office, taking over all public property pertaining thereto.

Mr. C. Winstanley has been continuously on duty in the office topographer and draftsman.

No field work has been performed during the year. The routin work of the office has been carried on; many maps have been mount and distributed, notably those of the Philippine Islands; tracings an blue prints have been made when required, and the care and preserv tion of the numerous and valuable astronomical and surveying instruments belonging to this office has consumed considerable time.

Very respectfully,

James F. McKinley,
*First Lieutenant, Eleventh Cavalry, Aid.*
*Acting Engineer Officer.*

Brig. Gen. G. L. Gillespie,
*Chief of Engineers, U. S. A.*

# APPENDIX H H H.

## ERECTION OF NEW BUILDING FOR GOVERNMENT PRINTING OFFICE.

### *REPORT OF CAPT. JOHN S. SEWELL, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

United States Engineer Office
for Erection of New Building
for Government Printing Office,
*Washington, D. C., July 1, 1901.*

General: I have the honor to submit the following report of operations upon the new building for the Government Printing Office up to June 30, 1901:

This building was authorized by the sundry civil act approved March 3, 1899. This act provides as follows:

> Government Printing Office building: That there be constructed, upon the land acquired by the United States in square numbered six hundred and twenty-four, in the city of Washington, District of Columbia, under the provisions of the act entitled "An act making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, eighteen hundred and ninety-nine, and for other purposes," approved July first, eighteen hundred and ninety-eight, a fireproof building for the use of the Government Printing Office, at a total cost, including approaches, elevators, lighting, and heating apparatus, not exceeding two million dollars.
>
> That the building herein provided for shall be erected under the direction and supervision of the Chief of Engineers of the Army, by contract or hired labor, or both, as may be to the best interests of the United States, and upon plans and specifications to be prepared by him and approved by the Public Printer. And the said Chief of Engineers is hereby authorized to enter into a contract or contracts for the construction of the whole or of any part of said building, and for the removal of the old dwellings and other buildings now standing upon said land, subject to appropriations to be made therefor by Congress, and he shall also have the employment of all persons connected with the work: *Provided, however*, That the selection and appointment of a competent architect to prepare the plans and specifications for the elevations of said building shall be made by the said Chief of Engineers and the Public Printer jointly.
>
> Toward the construction of said building and for each and every purpose connected therewith, including the cost of all professional and other personal services that the Chief of Engineers of the Army may deem necessary, and for the rent of office rooms in a locality convenient to the work, three hundred and fifty thousand dollars, to be immediately available. This appropriation and all appropriations which may hereafter be made for this purpose shall be expended under the direction and supervision of the said Chief of Engineers.

The limit of cost was increased from $2,000,000 to $2,429,000 by the joint resolution approved February 17, 1900, which reads as follows:

> *Resolved by the Senate and House of Representatives of the United States of America in Congress assembled*, That the limit of cost of the new building for the Government

Printing Office, authorized by the sundry civil act approved March third, eighteen hundred and ninety-nine, be, and hereby is, increased by four hundred and twenty-nine thousand dollars, or so much thereof as may be necessary, to meet the increased prices of building materials, and to permit of making the south end of the power house extension, for a depth of about forty-five feet from G street northwest, of the same height as the main building.

Previous reports upon this work were submitted on November 30, 1899, and on November 30, 1900. They were printed in Executive Documents No. 32, House of Representatives, Fifty-sixth Congress, first session, and No. 25, House of Representatives, Fifty-sixth Congress, second session.

As no report on this work has been previously submitted with the Annual Report of the Chief of Engineers, this one is practically made up of the two above referred to, with such additions as are required to bring it up to date.

The preliminary project for this building, in accordance with which the building was authorized and the first appropriation made, was prepared by me after consultation with the Public Printer and his mechanical staff, and submitted under date of January 13, 1899. The gist of this project was as follows:

The site of the new building is at the northwest corner of North Capitol street and G street west. It fronts 408 feet on G street and 175 feet 3 inches on North Capitol street. It is separated from the site of the present building, or collection of buildings, by Jackson alley. A space of about 60 feet by 112 feet at the northwest corner of the site is occupied by the original power house, which is thoroughly up to date, and has been incorporated as a part of the new plant. The preliminary project included the extension of the power plant to G street, with its present width and height, and the erection of a main building, U-shaped in plan, fronting 278 feet on G street, 278 feet on Jackson alley, 175 feet 3 inches on North Capitol street, with an interior court about 2[illegible] feet by 168 feet. This would leave between the power house and the main building a driveway 18 feet wide, running from G street to Jackson alley, and furnishing access to the interior court at its west end. The structure was to be fireproof, with masonry mainly of bricks; the interior to be finished with glazed and pressed bricks; all door and window frames to be of cast iron; the floors to be designed for a live load of 300 pounds per square foot, uniformly distributed, and to be thoroughly fireproof in all their structural features, but finished with about 1¼ inches of hard-wood flooring in all places where the employees are required to stand and work for any length of time.

The building was to be heated by steam, wired for electric light and power and for interior telephone and alarm systems, and furnished with all needful elevators, stand pipes, water tanks, and the best type of sanitary plumbing. Especial attention was to be paid to provision for safe and speedy exit in case of fire or panic, and for the health and comfort of the employees. The main building was to have seven stories, a basement, and an attic, and in the project the south end of the power house was to be divided into two stories.

There was to be a vault for the storage of stereotype plates under the G and North Capitol street sidewalks, and the basement of the main building was to extend under the interior court and the driveway.

The plans of the building have been developed along the lines described in the preliminary project, with one important addition, which was authorized by the joint resolution above quoted, and which consisted in making the south end of the new power house, i. e., the part over the coal room, part of the main building. This necessitated a sallyport to enable the driveway to debouch on G street.

At the time when the building was authorized the transfer of the site to the United States was not complete, and a number of old houses were still standing on it, many of them being occupied.

I was placed in charge of the construction of the new building under date of March 11, 1899. On March 20 an office was opened at No. 735 North Capitol street, nearly opposite the site of the work, and preliminary work on the plans was begun. A search was begun for a suitable architect to take charge of the elevations of the building, and after consideration of a number of names and examinations of specimens of work by the Public Printer and myself, Mr. J. G. Hill, of this city, was selected and appointed in the manner required by the act authorizing the building. He was appointed under date of April 3, 1899, and immediately took up the work of designing the elevations.

At the present time the architect's plans are all completed and approved, with the exception of such small sketches as are found necessary, from time to time, in carrying out the details of his designs.

In all discussions relative to the general lines of the floor plane, the number of stories, arrangement of rooms, the heating and other mechanical equipment of the building, the Public Printer was represented by his mechanical staff, consisting of Mr. H. K. Collins, chief engineer, and Mr. W. H. Tapley, chief electrician, of the Government Printing Office. I found that these gentlemen had made a careful study of the needs of the office, and had already arrived at perfectly definite conclusions in regard to many of the points brought up for discussion. Under these circumstances, it was deemed best for them, if possible, to design and supervise the installation of the mechanical equipment, as they were more conversant with the needs of the office than any outside expert could possibly be.

The Public Printer having very kindly consented, this office employed electrical and mechanical draftsmen, who, working under the supervision of Messrs. Tapley and Collins, have developed the plans for the mechanical equipment of the new building. Mr. Collins has charge of the plumbing and steam heating, and Mr. Tapley has charge of electrical wiring and elevators.

The plans for the foundations, structural work, fireproofing, and all other items not included under architectural details or mechanical equipment have been developed in this office.

On May 1, 1899, notice was received from the Public Printer that the transfer to the United States of the property included in the site was completed. The old houses had already been advertised for sale under date of April 18. On May 18 bids were opened and the houses sold to Mr. Andrew Gleason, the highest bidder, for the sum of $1,300. By July 6 he had completed the work of demolishing and removing the houses. Meantime the foundation and excavation plans were in course of preparation, and were so far advanced that bids were invited for the excavation work, under date of June 10, 1899. Bids were opened July 10, 1899, and the contract was awarded to S. Carmody & Son, the lowest bidder, at 44 cents per cubic yard for general excavation, 75 cents per cubic yard for trench excavation, and $2 per foot for test borings.

As soon as the site was cleared test pits were dug to the probable level of the base of the foundations, with a view to determining the bearing power of the soil. These tests resulted in very valuable data, proving that the safe-bearing power was not less than 4 tons per square foot, instead of only 2, as had been assumed in preparing the preliminary estimate. The tests were made as follows: The pits were excavated inside of drums 6 feet in diameter; a 12 by 12 inch Georgia pine timber was set up on end in the pit and braced to the sides, so as to keep it vertical, but leave it free to settle; a platform was built on its upper end by means of cross pieces and braces, and this was loaded with pig lead. A little earth was thrown in around the bottom of the stick to prevent the earth beneath, which was sand saturated with water, from working out from under the stick. This method of testing is quite severe and is hardly fair to the soil tested, because of the small area tested and the punching tendency of the stick. Nevertheless, the stick carried in different places from 8 to 12 tons, without any settlement that might not be charged up to finding a bearing in the loosened sand at the bottom of the pit. In designing the foundations the live load in tons under each column or pier was divided by four and the dead load by three; the sum of the quotients was taken as the requisite area for the base of the foundation in square feet. In computing these loads the building was assumed as fully loaded.

The sewer on the G street side of the new building was an 18-inch sewer laid under the parking. It was so high that it would have appeared in the G street plate vault of the new building, and it was doubtful whether it was large enough to carry the sewage from the new building in addition to what came from houses farther west on G street. At the request of this office the District government laid a new 21-inch sewer under the street and at a lower level opposite the site of the new building. It was found possible to get this new sewer sufficiently low to provide for the drainage of the new building by gravity alone—a very important point.

The soil on which the new building for the Government Printing Office stands is mainly sand, with here and there pockets of clay, and with more or less gravel everywhere. The ground water stood in it at a level not much below that of the basement floor at the southeast corner, and about 3 feet higher at the northwest corner: this indicated that there was a general movement of this water from the northwest to the southeast, a fact made more probable by the existence of a large and deep trunk sewer under North Capitol street, draining to the south, and also abundantly confirmed by subsequent observations.

There was so much water in the soil that it was utterly impossible to dig the trenches for the foundations without shoring them solidly with sheet piling; the sand would not stand vertically for a single foot unless it was shored. There is a conduit in Jackson alley carrying steam pipes and electric cables from the old power house to the old Government Printing Office. It was exposed by the excavation, and had to be shored up and underpinned. Considerable underpinning was also required about the Yale Steam Laundry, which joins the new building for the Government Printing Office on the west, and about the old power house. For these reasons shoring and underpinning make up quite an item in the cost of the foundations, which were finished, however, within the original estimate of cost.

In excavating for the foundations, wherever a clay pocket was struck the excavation was carried through it to reasonably clean sand, regardless of the grade. The trenches were filled up to grade again by the use mainly of a poorer grade of concrete than was used in the foundation piers, though in the beginning at one or two points the filling was done with gravel only.

The total amount of work done under the contract with S. Carmody & Son was as follows: General excavation, 29,828 cubic yards; trench excavation, 7,195 cubic yards; test borings, 300 linear feet. In addition, 2,160 cubic yards of earth have been excavated by hired labor and informal contract at points which could not be included in the work done under the formal contract.

The concrete foundations consisted of truncated pyramids under interior columns and truncated wedges under the walls; they were so proportioned as to receive the full load at all points with a pressure not exceeding 20 tons per square foot upon the top surface of the foundations; their sides sloped so as to spread the pressure over a sufficient area of the sand below, as determined by the method indicated above. The depth of the foundations was determined so that, allowing a few inches depth on all inclined surfaces for the porous concrete inevitable next to the forms, a line of pressure making an angle of 60 degrees with the horizontal should be contained entirely within the pier. The lower part of the pier was brought up above grade in all cases at least a foot, with vertical sides, before the slope began, so as to avoid a thin and weak toe. All concrete was mixed and deposited by day labor; hand mixing was the method used, as it was the cheapest under the conditions existing. The total quantity of concrete in the foundations is 6,960 cubic yards. The greater part of this was put in at a time when Portland cement was $2.43 per barrel, broken stone $1.90 per cubic yard, and sand $0.95 per cubic yard. The proportions varied from 1–3–6 and 1–3–7 for the piers proper to 1–4–12 and 1–3–10 for subgrade filling. The average of the entire quantity was 1–3–7. The cost of the concrete, exclusive of forms, was $5.985 per cubic yard. The cost of forms was $0.541 per cubic yard. The quantity of concrete saved by the use of forms was about 2,000 cubic yards. The total cost of forms was about $3,100. Thus the forms effected a net saving of about $8,800. These figures were derived from the cost at a time when the total quantity of concrete put in was a little over 5,700 cubic yards. That put in since has cost less, owing to cheaper materials. The conditions, so far as labor was concerned, were bad from the start; the work had to be begun before the excavation was finished, and the concrete gangs and the excavator's teams necessarily interfered with each other to a considerable degree; later, the concrete was put in a little at a time, which made the labor more costly. The total cost of labor was about $1.18 per cubic yard, exclusive of forms. The total cost of the concrete was about $6.50 per cubic yard, including everything. The contract price for similar concrete put in on similar work by private concerns about the same time was $7.50 per cubic yard. The stone used was taken just as it came from the crusher, the dust only being removed; with this exception, everything that would pass a 2-inch screen was taken. By this means a much denser concrete was obtained with a given amount of cement. It was mixed with just enough water to cause slight quaking after vigorous ramming. The rammers consisted of pieces of 6 by 6-inch white oak, with a pick handle let into one end of each parallel to the grain; this caused the other end of the white oak to be the striking surface. This form of rammer was used because it will admit of very vigorous ramming without crushing the bits of broken stone, as always happens when the striking surface is of iron.

As the basement of the new building for the Government Printing Office is to be used for the storage of paper it was of great importance to make it dry. Moreover, a number of elevator pits are necessary to enable elevators to land at the basement floor. These pits must be about 4 feet deep. It became evidently necessary to lower the ground water by amounts varying from 4 to 7 feet. After some study of the conditions it was decided to run one large drain to the north and west of all elevator pits and carry it into an old manhole near the North Capitol street sewer and opening into it, which is about two feet lower than the bottoms of the elevator pits.

The theory was that it would intercept the ground water and carry it by the path of least resistance to the large sewer; that this would lower the ground water at least 4 feet over all that portion of the site south and east of the drain, and establish a new gradient for the water surface for some distance to the north and west, thus keeping it well below the basement floor at all points. The drain is about 600 feet long and has a fall of only a little over 2 feet in this distance. The main line is of 12-inch terra cotta pipe, but there are some 8-inch branches. It is laid with open joints, and surrounded with broken stone, rather coarse next to the pipe, but quite fine at some distance from it; in addition, most of the joints were covered with burlap, to prevent silting up as far as possible. Two manholes are provided at convenient points, which will serve for examining the condition of the drain, and also as flushing reservoirs, should flushing be required. The drain is completed—all except the manhole covers and frames. It has accomplished all the objects for which it was put down. All the elevator pits, except one near the extreme west end of the building, are quite dry. This one shows a little moisture, and as the invert of the drain is only an inch or two lower than it, it may be necessary to diminish the depth of this pit by 3 or 4 inches. There is no sign of ground water now at any other point in the entire building.

Notwithstanding the success of the drain, it was considered best to damp-proof the basement, and a contract was made on March 14, 1900, with the Cranford Paving Company, for putting a damp-proof course on all foundations, on the backs of all walls where they are in contact with the earth, and in the pavements over those parts of the basement beyond the limits of the main building. Unless an asphalt pavement is used in the basement, the damp-proof course will also be extended under the basement floor, connecting with that in the foundations. It consists of Neuchatel asphalt, brought to a proper consistency by the addition of minute quantities of bitumen and Trinidad asphalt and a large dose of very fine gravel. On horizontal surfaces it is simply spread hot, to a thickness of about one-quarter of an inch. For application to vertical surfaces it is first molded in plates on a burlap backing; crushed slag is sprinkled over it and bedded to about half its depth in the hot asphalt. The surface of the wall is plastered with Portland cement mortar, and while this is still soft the asphalt plates, which have been allowed to cool, are pressed up against the wall so as to bed the projecting particles of slag in the plaster.

The plates are held against the wall by suitable braces until the plaster has set hard. The braces are then removed, the burlap stripped off, and the joints between the plates are closed by heating with a painter's hand furnace and smearing with a hot asphalt mixture, which makes the entire surface continuous. Neuchatel asphalt was used because of its well-known durability in the presence of moisture, and because the mixture of asphalt and gravel could be made sufficiently hard to cover the foundations without squeezing out under the weight of the superstructure, as coal tar or similar compounds would do. Up to date the waterproofing presents every evidence of being an entire success. The contractors were required, however, to guarantee it, under bond, for five years.

One reason for designing the foundations as they were was to avoid putting steel grillages beneath the basement floor, in the ground water. Portland cement concrete seems to protect steel under such conditions for a time, at least; but it seems reasonable to suppose that such action is due to the concrete having some excess of alkaline matter and thus neutralizing the acids contained in the moisture; if so, an indefinite supply of fresh water containing air and an acid such as $CO_2$ in solution would eventually neutralize the alkaline properties of the concrete, and then the steel would suffer. At any rate, it is safer to keep the steel above water, if possible, and in this case, by allowing a pressure of 20 tons per square foot on the concrete, it was possible to reduce the grillages to a sort of built-up base of stiffened beams, in no case occupying a space greater than 5 feet by 7 feet. This made it possible to keep them above the basement floor, and on top of the damp-proof layer.

The contract for the steel work was let on March 26, 1900, to the Phœnix Iron Company, of Philadelphia, Pa. In the specifications for the steel work bidders were requested to state when they could begin and when they could finish the work. It was deemed unwise, in the condition of the steel market at that time, to fix any dates, as it might deter responsible parties from bidding. The Phœnix Company agreed in their bid to begin work in two months and finish it in six months from the date of receipt of complete drawings. Bids for fireproof floor construction were opened at the same time as those for the steel work, and an examination of these bids made it evident that it would be desirable to change the steel floor beams and use lighter ones, with closer spacing, than had been shown on the original drawings. As this change involved a recalculation of weights on columns and girders, and new designs for nearly all the details, the contract with the Phœnix Iron Company was worded so as to require them to begin work within sixty days from the date of approval of the contract and finish it within six months from the date of beginning.

The revision of the drawings required a little more time than was expected, and, although the contract was approved about the middle of April, the drawings were furnished at such a rate that it would not have been fair to count time on the contractors from an earlier date than May 1, 1900. In order to be sure of doing them no injustice, however, they were notified that an application for extension of time for the completion of their contract, from December 13, 1900, to January 16, 1901, would be favorably acted upon in this office. They made this application, and it was approved.

The Phœnix Iron Company evidently underestimated the time required to complete so large a piece of work. Although they have been urged, in every way, to greater efforts, the erection is only just completed, and the painting is not quite finished yet.

The delay in the steelwork has not only resulted in the loss of valuable time, but it has also resulted in expenditures that would otherwise have been unnecessary. Contracts for other materials were made on the assumption that the steel would be on time. The contractors for these other materials have been practically on time, and it has been necessary to receive and store materials at considerable expense which might otherwise have been built in as fast as received. Moreover, it has been necessary to maintain just as many overseers, suboverseers, time clerks, etc., over the small force that the United States has been able to employ, as would have been required for a much larger force, thus making the contingent expenses too large a percentage of the cost of the work done to date.

Barring the delay, and some vexatious errors in shopwork, which were serious more for the time they consumed in correction than for any other reason, the steelwork is of unusually high quality, as to both materials and workmanship.

When, shortly after the building was authorized, prices of all building materials went up so rapidly and unexpectedly, it became evident that the strictest economy in design and execution would be required to finish the building within the limit of cost. This remained true even after the limit of cost was increased, and it materially influenced the design of the steel frame. It had been determined that a live load of 300 pounds per square foot on every floor should be provided for, and some rather careful calculations indicated that the total dead load could be kept within a limit of 125 pounds per square foot. It is quite certain that considerable areas of floor space in the new building will be loaded with a live load of fully 300 pounds per square foot. But whenever this occurs, the load will be absolutely quiescent, being due to storage only. Where the live load is a vibrating one, it will not exceed in actual weight 100 to 125 pounds per square foot. Under these circumstances, it was thought justifiable to use an unusually high unit strain in designing the steel work, provided a high quality of materials and workmanship were exacted. It was calculated that the saving in metal would more than offset any slight extra cost of materials and workmanship.

The chemical and physical qualities of the steel were covered by the following paragraphs, taken from the specifications:

### QUALITY OF STEEL.

46. All steel must be made by either the acid or basic open-hearth process. A chemical analysis must be made of each melt. Steel made by the basic process must not contain more than 0.05 per cent of sulphur or 0.05 per cent of phosphorus. Acid steel must not contain more than 0.05 per cent of sulphur or 0.08 per cent of phosphorus. All steel must be uniform in character for each specified kind.

### PHYSICAL PROPERTIES.

47. The tensile strength, limit of elasticity and ductility, shall be determined from standard test pieces of at least one-half square inch cross section, cut from finished material representing every melt. All steel, except that for rivets, must show, when tested as above, an ultimate strength of from 63,000 to 70,000 pounds, an elastic limit not less than 55 per cent of the ultimate strength, and an elongation in 8 inches of not less than 22 per cent. Rivet steel must show, under the same conditions, an ultimate strength of from 52,000 to 60,000 pounds per square inch, an elastic limit of not less than 55 per cent of its ultimate strength, and an elongation in 8 inches of not less than 26 per cent. All broken samples must show a silky fracture of uniform color.

48. The medium steel above specified must stand bending 180° around a 1-inch pin, either cold, hot, or after being heated to a cherry red and cooled in water at 60° F., without cracking on the convex surface. Rivet steel must stand bending double

to close contact, without sign of fracture on the convex surface. Punched rivet holes in medium steel, pitched two diameters from a sheared edge, must stand drifting until their diameters are increased by 40 per cent without cracking the metal.

In the matter of workmanship, the chief and only unusual requirement of the specifications was that all rivet holes should be punched small, and then reamed to full size, with all pieces assembled together, and that the reamed holes must be true and cylindrical and at right angles to the pieces through which they passed.

A great deal of time and study was given to the question of devising connections which would be easy of execution, in both shop and field, and which would at the same time cause the columns to be loaded either centrally or symmetrically.

The column section made up of two channels, back to back, with cover plates or lattice bars, according to the load, was selected as standard. It was found that by using 15-inch channels it would be possible to dispense with cover plates on all wall columns with few exceptions. As most of these columns receive only the end of a girder at each floor the seat for this girder was riveted in between the channels, so as to load the column centrally. In nearly every case where this type of connection could not be used, whether for wall columns or interior columns, the loading was symmetrical, and the ordinary form of bracket was used to receive girders and beams. In a few cases of nonsymmetrical loading allowance had to be made for bending strains due to eccentricity. In designing the columns all floors were assumed fully loaded. The following formula was used for columns from the fourth floor up:

$$p=\frac{17000}{1+\frac{l^2}{11000\ r^2}}$$

This is the form of Gordon's formula given in the Pencoyd Iron Works' handbook, edition of 1898, page 270. In the second and third stories the numerator of the second term was increased to 18,000 and in the first story and basement to 20,000. This is the only allowance made anywhere for the improbability of a full load in the building. Past experience with Government buildings shows that they are likely, in the end, to receive their full load, and it is not safe to go further than above indicated in the direction of reducing live loads or increasing unit strains in the lower columns.

In designing girders and selecting rolled beams a unit strain of 18,000 pounds per square inch was adopted as the maximum, the net section of plate girder flanges being used. All floor beams rest on shelf angle brackets riveted to the webs of the girders, and all girders are designed without stiffeners, except at the ends. This added a small amount to the weights of the girders, but greatly simplified shopwork and erection. In other details not specially mentioned the usually accepted rules of good practice were followed.

By using the high unit strains stated above the amount of steel was reduced by fully 800 tons. The contract was let at prices which average about 3.7 cents per pound, or $74 per ton, erected, with two coats of paint. This was a rather low figure at the time of letting the contract, and it is doubtful whether any material reduction in the pound price would have occurred if the requirements as to quality of materials and workmanship had been such as to permit of the use of stock materials and punched holes.

The price at which this contract was let resulted in a considerable saving on the steel frame; but much of the cast iron and special steel work which was included in the general item of steel work in the revised estimate of cost of last year, and many of the purely architectural features, will exceed the amount they were estimated to cost and the saving on the steel frame will just about compensate for the increase in these items, with a small margin to spare.

Although such a building as the new building for the Government Printing Office probably will need no provision against wind pressure when completed, it was deemed best to provide for it. By this means even if the wind never strains the bracing, yet all vibrations due to machinery and any tendency to horizontal movement of any kind will be distributed throughout the entire structure, and more effectually absorbed by the greater mass thus made available.

A wind pressure of 30 pounds per square foot was assumed all over the exposed faces of the building; it was impossible to secure the desired stiffness by rigid connections, for the main floor girders were so much heavier than the columns, and the inclination of the curve of mean fiber would be so considerable at the points of support with the girders fully loaded, that rigid connections would introduce dangerous bending strains in the columns. Inasmuch as the connections could not be made rigid it was deemed best to deprive them of rigidity altogether and depend on the floor systems to secure the necessary stiffness. The stairway wells on G street and Jackson alley afforded an opportunity to introduce diagonal bracing in a north and south plane from the top to the bottom of the building. The ventilating shafts carried up in the middle of the wings afforded similar opportunities for diagonal bracing in an east and west plane. These systems of bracing afford vertically rigid reaction points for taking up any shear transmitted by the floor systems, just as the quoin and miter posts do in a lock gate with horizontal ribs. Of course, in the completed building the walls will assist in taking up shear parallel to themselves, thus affording additional points of support to the floor systems, considered as stiffening girders. In considering the floors in this capacity it was assumed that the floor beams next to the wall carried all the tensile flange stress, while the system of arches between them was regarded as a web, capable merely of resisting shear and compression. This made it necessary to splice the top flanges of these floor beams by means of tie plates across the top flanges of the girders, as the connection of the beams to the girders was not quite strong enough to transmit the maximum tensile strain due to the assumed wind pressure. These plates were put in, and are doubtless a superfluous precaution, but their cost was a trifling matter, and they certainly add immensely to the strength of the building against any and all horizontal forces.

The diagonal bracing was all made stiff, and it was assumed that when one diagonal of a panel was in action the other must be, so that each was designed to assist only half the shear in its panel. In the stairway wells the girders necessary for carrying the floor beams and inclosing walls were utilized for wind struts. As they had to be quite deep to carry their vertical loads, they were made double in the form of built-up channels and proportioned for the vertical loads only. It was found possible to attach the diagonals with connections symmetrical about a point considerably below the neutral axis of these channel girders, so the compression due to strains in the diagonals will merely reverse part of the tension in the lower half of the girders without dangerously increasing the compression in the upper half.

The selection of a suitable system of fireproofing for the floors, columns, and girders of the new building for the Government Printing Office was the most perplexing question presented in connection with the structural design. Electricity is the sole motive power of the Government Printing Office, and every machine requiring a considerable fraction of a horsepower has its own motor. The character of the work changes so greatly that entirely new arrangements of both machinery and lights become necessary from time to time. This requires an exceedingly flexible system of wiring, for both light and power, and is a very important factor in the selection of the system of fireproofing. It must be possible to cut new holes in the floors whenever and wherever necessary, in order to bring wires up to the motors, and this cutting must not, even after many years, impair the strength of the floor. It must equally be possible to hang new lights from the ceiling, and, as the building is to be handsomely finished, it is necessary to avoid disfiguring both floor and ceiling by changes in the wiring.

One feature of the steel frame suggested the general solution; the wings of the building are 68 feet wide in the clear—i. e., this is the clear width of the room. It was considered necessary by the Public Printer to have but one row of interior columns in each wing. This made the span of the floor girders 34 feet, and, to carry the very heavy loads assumed, they had to be made nearly 3 feet deep. This depth was sufficient to carry both the floor construction and a separate ceiling beneath, with space enough between the two for a man to crawl, and even work, with more or less freedom, in a recumbent position. It was determined to adopt this construction and keep all horizontal electric cables and wires in this space, where they will be out of sight and protected in case of fire. All the wiring will be done, in the first instance, after the floor construction is finished and before the ceiling is put in. Any subsequent changes will have to be made by men crawling in between the floor and ceiling.

It remained to select the types of construction for floor and ceiling. It was determined to make the floor proper thoroughly fireproof, regardless of the ceiling. The various so-called fireproof floors in use at the present time can all be classed under one of the following heads:

First. Segmental brick arches, with or without protection for the lower flange of the beam.

Second. Flat or segmental arches of dense or porous hollow tiles, usually with protecting slabs on the under side of the beam, engaging the skewbacks.

Third. Composite floor lintels, made of steel bars, or mesh work, in combination with Portland cement concrete.

Fourth. Composite floor lintels, made of steel bars, or mesh work, in combination with compositions the base of which is plaster of paris.

Of these types of floors, the segmental brick arch, if combined with really adequate protection for the lower flanges of the floor beams, and if made of highly refractory bricks, is ideal, so far as resistance to fire, water, and dead load are concerned. It is practically indestructible, and, for large unit loads, it is no heavier than other forms of floor construction, with the same factor of safety.

The hollow tile floor, in the form in which it usually finds its way into commercial buildings at the present time, is little better than a mere travesty on fireproof construction; the thickness of the webs is determined, not by fireproof and load-carrying considerations, but by the minimum thickness required to make the green tile stand up without distortion in the drier and the kiln. It is a very successful attempt to discover the cheapest thing which can pass muster as a fireproof floor, and afford a flat surface for ceiling plaster. The results of fire tests and actual fires show that the thin webs crack and fly to pieces under even moderate applications of fire and water, and the soffit pieces fall from the lower flanges of beams and girders almost without provocation. Even in cases where the tiles have protected the steelwork for a time, they themselves have, almost invariably, been a total loss over those floor areas subjected to considerable heat.

If hollow tiles were made porous, of refractory clay, and with webs from 1½ to 2 inches thick, a flat tile fireproof floor, properly laid, would deserve its name. In the beginning probably a few such floors were made, but as contractors became better acquainted with the material and found out how much abuse it would stand without going back on them, they skinned it down under stress of competition, until now a flat hollow tile floor, under average conditions, owing to scant design of tiles and poor workmanship used in setting them, has less intrinsic merit than any other form of construction commonly accepted as fireproof. The same remarks apply to the large thin slabs used for column coverings. The whole system in its present form may do very well in commercial buildings, where the owner balances the cost of insurance against the interest on the greater first cost of really fireproof construction, but it should never be allowed in a Government building of any importance.

Of the various forms of steel-concrete floor construction, many are excellent, and all possess more or less merit. In a hot fire the better forms would probably resist collapse, but would have to be largely repaired when the fire was over. They have this merit, that if not properly built they will usually fail at once and throw the burden on the dishonest builder instead of his client. As commercially applied they are preferable to the hollow tile floors with which they are competing.

The combinations of metal and plaster of paris are light in weight, sound-proof, poor conductors of heat, sufficiently strong for light floor loads, and sufficiently fire resisting for most purposes where light construction is suitable. But they are wholly unsuitable for a building like the new building for the Government Printing Office, because the plaster composition is too soft and friable, and it inevitably yields, somewhat slowly, but none the less surely, in the presence of fire and water.

Of all the types of floor construction above described the segmental solid brick arch, with adequate protecting skewbacks, and the heavy-webbed hollow tiles, are the only ones that can properly be described as fireproof; the others are merely fire resisting, though a well-designed and well-executed system of cinder concrete resists so well that probably it also should be classed as fireproof.

So far as weight-carrying capacity, convenience of drilling cable holes, and fire-resisting qualities are concerned, the segmental brick arch, the heavy, hollow tile floor, or a cinder concrete arch without mbedded metal would be well adapted for use in the new building for he Government Printing Office.

The commercial forms of hollow tile floors can not be drilled without destroying at least one entire tile, and all forms of concrete construcion with embedded metal are open to the objection that drilled holes would often strike strands or bars of metal, which would probably be cut. This, in the end, would detract seriously from the strength of the floors. So far as facility of repairs is concerned, where a hole is to be abandoned, the solid segmental arch of brick or concrete is the best of all, as it is only necessary to fill the hole with Portland cement mortar and the strength of the floor is fully restored.

When bids were first invited for the fireproof construction, bidders were requested to submit their own plans, to meet the conditions, which were fully stated. None of the forms of floor construction above described as fireproof are in the market, and it was thought that possibly some of the forms that are in common use might be so modified as to be satisfactory, and cost less than any special construction specified by this office. The result was more or less disappointing; very few of the bidders showed any disposition to modify their usual types of construction, and several of them made a very determined fight to force their systems into the building, unchanged, for the sake of the apparent official indorsement that would result therefrom. This ended in the rejection of all bids. One of the competing firms, however, showed a willingness to make and furnish solid bricks of porous terra cotta, at a reasonable price. It was then determined to invite bids on definite plans and specifications, based on the use of these bricks for floor arches, and for column and girder covering.

In connection with the floor arches, a very heavy skewback was designed, having protecting flanges 1½ inches thick. These are made specially for this work; the protecting flanges are very heavy and strong, and meet, with a small mortar joint, under the beam. The beam protection is the weakest point of this design, as in all others, but it is so much more substantial than any of the forms commonly used that it is probably fair to call it fireproof and not merely fire resisting; at any rate, a mere fire stream has not sufficient force to bring it down unless accompanied by prolonged and very intense heat.

The lower flanges of girders are covered with shoes of the ordinary form, made in two pieces, meeting under the girder; but they are much heavier than those ordinarily used, being about 2½ inches thick. They are filled with mortar and squeezed on, so as to have a solid bearing, and are then wrapped all around with wire lathing and plastered with Portland cement mortar. On top of the shoes, on either side of the girder, is built a 4-inch brick wall of the same bricks that are used for floor arches. The wire lathing is applied before the 4-inch walls are built. They thus serve to hold the lathing firmly in position. By this means it is hoped to delay the falling of the girder shóes, even if they should be cracked by fire and water. But they are so thick and tough and strong that no ordinary application of fire and water will affect them. The 4-inch walls on the sides of the girder are carried to the top flange before the floor arches are built. The latter are then built, abutting at their ends against the upper part of the 4-inch walls, thus bracing them securely in position.

The columns are covered with 4 inches of porous terra-cotta brickwork, built around them; the inside of the column, and all space between it and the fireproofing, are filled solid with Portland cement concrete.

This makes an exceedingly strong and solid construction, protects the inner surfaces from corrosion, adds immensely to the stiffness of the column, and therefore to its strength, and it is believed will thoroughly protect the columns in any possible fire.

Many columns are covered by the brickwork of walls and interior partitions, instead of the porous terra-cotta bricks; and even those that are covered with the latter have a dado of enameled bricks at the base in each story. But all the bricks used in the building are made of more than ordinarily refractory clay, and it is safe to say that the column protection everywhere is the most perfect part of the entire fireproof system of the new building for the Government Printing Office.

The ceilings are supported by 3-inch **I** beams framed into the girders below the floor beams. The floor beams were originally 12-inch **I** beams, about 6 feet apart; the ceiling beams were spaced about 3 feet apart, and low enough to enable a man to crawl into the space between each pair of floor beams on top of the ceiling, provided a segmental arch or some form of concrete system were used for the floors. This would have necessitated framing a manhole in the ceiling between each pair of floor beams. When bids were opened for steel and fireproof construction it became evident that it would be better to use 8-inch floor beams only 3 feet apart; these, with 4-inch segmental arches, would form such a shallow floor construction that there would be room for a man to crawl from bay to bay between the floor and ceiling beams, with a space 18 inches deep under the crown of the arch. This plan dispensed with 60 per cent of the manholes, the framing for which was very expensive; it was much more nearly suited to the requirements of the Printing Office; it added several hundred tons to the weight of floor beams, but the extra cost of these was largely counterbalanced by the saving in manholes, and it was formally adopted. This was the change in plans which caused the delay in furnishing drawings to the steel contractors.

It was desirable to limit the thickness of the ceiling construction to about 2½ inches. It was not considered safe to trust terra-cotta slabs over a span of 3 feet, and it was desired to limit the amount of auxiliary steel to the least possible weight, so it was finally decided to use slabs made of broken brick and Portland cement concrete, strengthened by small steel bars and supported at intervals of 2 feet by light T irons laid on the lower flanges of the 3-inch **I** beams. The slabs are supported at such a level that the upper half of the 3-inch beams will be exposed and available for carrying insulators; the tie-rods of the floor arches are exposed above the ceiling and will likewise be available for stringing wires. Indeed it was more for this purpose than any other that they were put in, for the side walls of the building are abundantly able to resist the thrust of the end floor arches of each bay. Holes have been punched through the webs of the girders at suitable points; enameled iron pipes passing through these holes and built in with the girder covering will afford passage for wires and cables from bay to bay between girders, so that all the wiring will be concealed and protected, yet accessible for repairs and changes. The small holes that will have to be drilled in the ceiling slabs for hanging lights can easily be worked around the embedded bars, and they can be neatly cut in the concrete. The ceilings and girder coverings exposed below them, as well as the columns above the enameled brick dadoes, will be finished with ordinary plaster.

The above description applies to those parts of the main floors that are used for the ordinary operations of the office. There are other places where brick arches would be very difficult to put in because of irregular framing, or where it is desired to have a sloping grade for the finished floor, though the supporting steelwork is level. Such places are the roof, the stairways, the pavements over the interior court, the driveway, and the plate vault. For all of these a steel and concrete floor system is well adapted, because irregular framing does not affect it, and it can be stilted up on the beams, so as to have any desired slope, without materially adding to the dead load, as would be the case with brick arches and a concrete filling above, increasing in thickness to suit the grade.

Moreover, wherever such conditions exist in the new building for the Government Printing Office no drilling will be required, and the probability of the direct application of fire is very remote. This type of construction was accordingly adopted for the places mentioned above; stone concrete is used where strength is the first requisite, and brick concrete where strength is of secondary importance, because brick concrete will probably resist fire better than stone and is lighter. The brick concrete will be used in the roof, the stairways, and the ceiling slabs, and stone elsewhere.

At the second opening of bids for fireproof construction the lowest bidder was the Fawcett Ventilated Fireproof Building Company, Limited, the same firm that displayed a disposition to make and use the porous terra-cotta bricks before. They have a very refractory clay, which makes the strongest and toughest porous terra cotta I have ever seen. They have made a beginning of the work in the field and show every disposition to execute it in a thorough and effective manner. All terra cotta is set in Portland cement mortar.

The lowest bidder for the concrete fireproof construction was the Brennan Construction Company, of this city, and they also have made a fair beginning.

Some of the bidders who participated at the first opening of bids were apparently dissatisfied at the rejection of their plans and declined to bid a second time. But quite a number did bid a second time, and one of these, the Roebling Construction Company, of New York, submitted an alternative plan of decided merit, involving the use of protecting terra-cotta skewbacks with segmental arches of cinder concrete sprung between them for the floor systems. Had this bid been the lowest it would have received very serious consideration and would probably have been recommended for acceptance.

The masonry of the building has been begun and carried on by hired labor, just as fast as the progress of the steel work would allow. At the present time the walls, counting the basement as one story, are from one to four stories high, and average about two stories high. Had the steel work been on time, and no other unforeseen contingency arisen, they would have been nearly two stories higher.

The architectural plans, as finally approved, call for an exterior finish of hand-made red bricks—a few pressed, but most of them not pressed—with a sand finish, except in the interior court, where an almost white face brick is used to improve the light. The red bricks will be trimmed with Maynard sandstone and a considerable amount of ornamental terra cotta. The cut stone and ornamental terra cotta cost more than it was thought they would, but it should be stated that the estimate was based only on a general idea and not on an accurate knowledge of what would be required. It was necessarily made in advance of detailed plans. Savings on the steel contract, however, have enabled the architect's plans to be adopted unchanged, which is much better for the building. His design is very simple and dignified, and does not contain any excess of ornamentation at all.

Inside, the walls of the building will be finished with a dado of enameled bricks about 6 feet high, and above that with white face bricks. A few rooms, used for office purposes, will be plastered, and the main entrance will probably be finished in plaster and marble.

The common bricks and red face bricks are furnished by the Frederick Brick Works, of Frederick, Md.; the enameled bricks, by Andrew Ramsay, of Mount Savage, Md.; the white face bricks, by E. R. Diggs & Co., of this city. The red face bricks are up to the usual standard for good bricks in their class; all the others are much superior to the average of even very good bricks; indeed, it is hardly too much to say that they are the best, in their respective classes, that can be obtained in this market.

In addition to the dadoes on the main walls, enameled bricks will be used to line all stairway walls, elevator walls, and toilet rooms. All stairway wells are shut off from the main building, from top to bottom, by brick walls, having only one fireproof door for communication at each floor level. All brickwork is laid in Portland cement mortar to prevent shrinkage and add to the rigidity of the finished structure.

All of the work done by hired labor so far has been done well within the estimate of cost, and much better than it could have been done by contract. Much of the credit for this belongs to the field force, and especially to Mr. Mark Wilmarth, assistant engineer, in general charge of field work; Mr. John I. King, general overseer, and Mr. A. L. Parsons, suboverseer, all of whom have been faithful and loyal to the interests of the United States, and have displayed marked ability, accuracy, and good judgment in the discharge of all their duties.

All of the window and door frames in the new building, except a very few special ones, will be of cast iron; a contract for them has been let to the Brown-Ketcham Iron Works, of Indianapolis, Ind., and the frames made by them so far show excellent work throughout.

Cast-iron baseboard will be used throughout the building, and corner guards of cast iron will be used on all salient angles of brickwork to prevent chipping by trucks.

The elevator pits will be lined with cast-iron tanks in order to afford a hard and durable finish.

All salient corners everywhere, liable to be struck by either trucks or teams, will be protected by heavy cast-iron or rolled-steel guards, and faces of walls are similarly protected in the driveway, the interior court and Jackson alley.

The weather surface of the roof will probably be of vitrified tiles, laid in Neuchatel asphalt. All floors of working rooms will be finished in hard maple, probably laid in blocks, in Neuchatel asphalt; but however laid, hard maple flooring will be used, because of its superior resistance to truck wheels and other abrasive and crushing effects.

The window sash will be of wood glazed, with plate glass on the North Capitol and G street fronts.

All doors, except those for the executive offices, will be fireproof, and all hardware simple in design, but of the best possible quality. As hard-wood doors will probably be used in the executive offices, for the sake of appearances, they can not very well be made fireproof.

The plumbing, heating, and electric wiring of a building such as the new building for the Government Printing Office not only constitute an immense task, but they require an intimate knowledge of the daily needs of the office. No one could be supposed to possess this knowledge in such complete and accurate form as the chief engineer and chief electrician of the Printing Office, since it is their duty to keep all such equipment in working order every day. For this reason it was thought best that they should supervise the design and installation of this part of the work, if possible. The Public Printer very kindly consented, and, as already stated, this office employed mechanical and electrical draftsmen, who have been employed under the chief engineer and chief electrician in making the plans. The estimates of cost for the plumbing, heating, and wiring systems were prepared by the chief engineer and chief electrician; the plans have been developed under their direction, and the work will be installed under their supervision. Thus they have the opportunity to settle upon the character of the equipment which it will be their duty to maintain in working order, and there can be no question as to its being the best for its purpose.

The system of heating adopted is the direct-indirect. Coils will be placed in pockets under the windows, fresh air will be admitted under the window sills and deflected by a baffle plate through the coils and into the building. Large ventilating shafts carried up through the centers of the rooms will have registers opening into each story, and exhaust fans at the top will insure a draft. It is realized that this system is not as perfect as an indirect system, with fans to force the fresh warm air into the rooms through properly arranged ducts, but the space required for blowers and indirect coils in the basement and for ducts throughout the building could not be spared, and it was necessary to select the next best plan. The fresh-air inlets are provided with strong and simple dampers, whereby they can be wholly or partially closed, and they are not made quite as large as has been customary in the past. It is hoped that this precaution, together with the positive action of the exhaust fans, will make the system more successful here than it has been in many cases, where too much cold air was admitted in severe weather and the inlets have been wholly and permanently closed by the occupants of the building, thus making systematic ventilation impossible.

The employees in the new building for the Government Printing Office will be provided with filtered and cooled water for drinking, which will be kept circulating through pipes with taps at convenient points.

The building will be supplied with all needful standpipes, fire hose, etc., as well as such systems of gas and water pipes as may be needed for manufacturing purposes.

The plumbing fixtures will be first-class and carefully selected with reference to the needs of the office. The same remarks apply to wiring, elevators, and all other electrical work. A more detailed description of the piping and wiring systems will be submitted in the next annual report.

At the present time the underground drains and the "roughing in" of the plumbing are nearly completed, the steam mains and risers ar nearly all in, and the standpipes, supply pipes, etc., are well advanced.

For the electrical work, all the cable hangers in the basement an many feet of conduits, both terra cotta and flexible metallic, have bee installed; a large number of pieces of enameled pipe, intended to affor a passage for wires through holes in the webs of the girders, have al been put in.

The building will probably be practically completed by July 1, 190 at least so far as to permit the Public Printer to begin moving th machinery and employees into it.

Everything so far indicates that the authorized limit of cost, all o which has been appropriated, will be sufficient to finish the building with a small margin to spare.

The present condition of the appropriation is as follows:

| | | |
|---|---|---|
| Amount appropriated by act of March 3, 1899 | | $350,000.0 |
| Amount appropriated by act of June 6, 1900 | | 775,000.0 |
| Amount appropriated by act of March 3, 1901 | | 1,304,000.0 |
| | | 2,429,000.0 |
| June 30, 1901, amount expended to date | | 955,158.6 |
| July 1, 1901, balance unexpended | | 1,473,841.3 |
| July 1, 1901, outstanding liabilities | $119,614.02 | |
| July 1, 1901, covered by existing contracts | 391,539.38 | |
| | | 511,153.4 |
| July 1, 1901, balance available | | 962,687.9 |

A schedule of expenditures to date, under various heads, is as follows:

| | |
|---|---|
| Excavation and earth filling | $27,232.9 |
| Shoring, underpinning, etc | 8,351.8 |
| Concrete | 46,116.2 |
| Structural steel | 473,279.6 |
| Cast-iron bases | 6,340.2 |
| Cast-iron baseboard, etc | 5,640.0 |
| Miscellaneous castings | 833.2 |
| Fireproofing | 96,546.16 |
| Brickwork | 79,650.6 |
| Cut stone and ornamental terra cotta | 24,846.4 |
| Door and window frames | 40,006.4 |
| Stairways | 85.0 |
| Elevators | 79.5 |
| Plumbing and drainage | 17,584.8 |
| Heating and ventilating | 11,456.5 |
| Electric wiring | 6,875.4 |
| Tanks | 588.0 |
| Waterproofing | 9,992.8 |
| Granolithic and asphalt pavements | 1,573.1 |
| Scales, etc | 216.5 |
| Roofs, skylights, etc | 5,190.7 |
| Contingencies (architect's fees, preparation of plans, office expenses, supervision in field, etc.) | 70,274.2 |
| Tools, working plant, temporary buildings, etc | 17,801.9 |
| Miscellaneous labor and materials, holiday pay, etc | 5,992.4 |
| Total cost of work in place | 956,555.61 |
| Materials purchased, but not yet in place | 118,217.02 |
| Total | 1,074,772.63 |

The total quantities of work done and materials in place in the permanent work are as follows:

| | | |
|---|---|---|
| Excavation | cubic yards | 42,010 |
| 20-inch sewer in G street | linear feet | 480 |
| Cast-iron drainage pipe: | | |
| 8-inch | do | 725 |
| 6-inch | do | 447 |
| 5-inch | do | 49 |
| 4-inch, and less | do | 580 |
| Cast-iron fittings of all sizes | | 230 |
| Terra-cotta drain: | | |
| 12-inch | linear feet | 690 |
| 8-inch | do | 570 |
| Fittings, all sizes | | 36 |
| Concrete (all kinds) | cubic yards | 7,283 |
| Bricks (all kinds) | | 2,809,000 |
| Cement (for laying bricks) | barrels | 4,508 |
| Sand (for laying bricks) | cubic yards | 1,541 |
| Steel, erected in place | pounds | 12,612,691 |
| Cast-iron bases, erected | do | 327,000 |
| Fireproofing: | | |
| Column covering | linear feet | 2,168 |
| Girder covering | do | 21,258 |
| Floor arches (terra cotta) | square feet | 213,440 |
| Concrete floor construction | do | 18,430 |
| Waterproofing: | | |
| Backs of walls | do | 10,243 |
| Foundations | do | 15,956 |
| Plate vault roof | do | 7,562 |
| Flashing | linear feet | 394 |
| Column guards, set in place | | 512 |
| Wheel guards, angle guards, etc | | 26 |
| Vitrified brick paving | square feet | 5,837 |
| Skylights on boiler house and engine room | | 2 |
| Tile roofing on power house | square feet | [1] 7,000 |
| Corrugated roofing on power house | do | [1] 7,000 |
| Electrical installation: | | |
| Terra-cotta conduit | linear feet | 3,115 |
| Flexible conduit | do | 22,550 |
| Lead bushings | pieces | 5,150 |
| Iron boxes | do | 564 |
| Enameled pipe, 1¼-inch | do | 4,036 |
| Enameled pipe, 3-inch | do | 255 |
| Clamps and couplings | do | 161 |
| Heating and ventilation: | | |
| Ventilator frames, set in walls | | 48 |
| Black pipe, 10-inch | linear feet | 527 |
| Black pipe, 8-inch | do | 392 |
| Black pipe, 6-inch | do | 211 |
| Black pipe, 5-inch | do | 1,237 |
| Black pipe, 3-inch | do | 3,393 |
| Black pipe, 2½-inch | do | 3,742 |
| Black pipe, 1-inch | do | 79 |
| Black pipe, ½-inch | do | 388 |
| Galvanized pipe, 7-inch | do | 74 |
| Galvanized pipe, 5-inch | do | 1,669 |
| Galvanized pipe, 4-inch | do | 106 |
| Galvanized pipe, 3-inch | do | 3 |
| Galvanized pipe, ¾-inch | do | 5 |
| Cast-iron pipe, 8-inch | do | 10 |
| Fittings of all kinds | | 1,219 |
| Beam clamps and pipe hangers | | 412 |

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[1] Approximate.

| | | |
|---|---|---|
| Plumbing: | | |
| Cast-iron pipe, 8-inch | linear feet.. | 73 |
| Cast-iron pipe, 6-inch | do.... | 45 |
| Cast-iron pipe, 5-inch | do.... | 11 |
| Cast-iron pipe, 4-inch | do.... | 58 |
| Cast-iron pipe, 3-inch | do.... | 1 |
| Cast-iron pipe, 2-inch | do.... | 5 |
| Cast-iron fittings of all kinds | | 29 |
| Black pipe, ½-inch | linear feet.. | 14 |
| Galvanized pipe, 6-inch | do.... | 45 |
| Galvanized pipe, 5-inch | do.... | 1,34 |
| Galvanized pipe, 4-inch | do.... | 2,05 |
| Galvanized pipe, 3-inch | do.... | 1,71 |
| Galvanized pipe, 2-inch | do.... | 2,34 |
| Galvanized pipe, 1½-inch | do.... | 2,63 |
| Galvanized pipe, 1¼-inch | do.... | [illegible] |
| Galvanized pipe, 1-inch | do.... | 66 |
| Galvanized pipe, ¾-inch | do.... | 11 |
| Fittings of all kinds | | 91 |
| Clamps and pipe hangers | | 53 |
| Cut stone work: | | |
| Coursed ashlar, set in place | linear feet.. | 3,70 |
| Sills and lintels, set in place | do.... | 60 |
| Cast-iron door and window frames, set in place | | 19 |

The following is a list of all contracts which have been let from th beginning of the work to the present time:

| Date. | Name of contractor. | Subject of contract. | Price or amount. | Present condition. |
|---|---|---|---|---|
| 1899. | | | | |
| July 15 | S. Carmody & Son | Excavating and boring: | | |
| | | Trench excavation. | 75 cents per cubic yard | Completed. |
| | | General excavation. | 44 cents per cubic yard | |
| | | Borings | $2 per linear foot | |
| Aug. 19 | Thos. R. Riley | Lumber: | | |
| | | 3 by 8 Virginia pine. | $13.45 per thousand | Do. |
| | | 6 by 6 Virginia pine. | do | |
| | | 4 by 6 Georgia pine | $24.75 per thousand | |
| | | 12 by 12 Georgia pine. | $28.75 per thousand | |
| | | 8 by 8 Georgia pine | do | |
| Sept. 28 | Columbia National Sand Dredging Co. | Sand | 95 cents per cubic yard | Do. |
| Sept. 28 | The Cranford Paving Co. | Broken stone: | | |
| | | 1-inch stone | $2.24 per cubic yard | Do. |
| | | 2-inch stone | $1.90 per cubic yard | |
| Sept. 30 | Jas. H. McGill | Portland cement | $2.43 per barrel | Do. |
| Oct. 4 | Thos. Somerville & Sons. | Pipe and fittings | $1,815.29 | Do. |
| Dec. 13 | Standard Brick Co | Common red brick | $9.23 per thousand | Do. |
| 1900. | | | | |
| Mar. 14 | The Cranford Paving Co. | Waterproofing | Foundations, 25 cents square foot; vertical walls, 27 cents square foot; flashing horizontal courses against walls, 30 cents linear foot. | In force. |
| Mar. 26 | The Phœnix Iron Co. | Structural steel | Average price per pound, 3.67 cents; estimated amount, $465,000. | Completed. |
| Apr. 23 | Petersburg Iron Works | Cast-iron bases | 1.89 cents per pound | Do. |
| May 15 | Andrew Ramsay | Enameled bricks | Estimated amount, $75,000 | In force. |
| July 23 | N. J. Foundry and Machine Co. | Electric hoists | $6,430 | Completed. |
| Aug. 2 | The Fawcett Ventilated Fireproof Building Co. | Terra cotta fireproofing. | Estimated amount, $125,766 | In force. |
| Aug. 3 | Bing Foundry and Machine Co. | Cast-iron wheel guards. | $830 | Completed. |
| Aug. 4 | The Brennan Construction Co. | Concrete fireproofing. | Estimated amount, $36,915.50 | In force. |
| Aug. 6 | Edwd. R. Diggs & Co. | Light-face bricks | Estimated amount, $37,628 | Do. |

| Date. | Name of contractor. | Subject of contract. | Price or amount. | Present condition. |
|---|---|---|---|---|
| 1900. | | | | |
| Aug. 6 | Wm. D. Gill & Son | Lumber: | | |
| | | 1 by 12 by 16, Virginia pine. | $14.75 per thousand | In force. |
| | | 1 by 6 by 16, Virginia pine. | $12.75 per thousand | |
| | | 4 by 6 by 12, Virginia pine. | 18¼ cents per piece | |
| | | 3 by 12 inches, Virginia pine. | $14.25 per thousand | |
| | | 2 by 12 inches, Georgia pine. | $20 per thousand | |
| Aug. 6 | John B. Lord | Concrete sand | 90 cents per cubic yard | Do. |
| | | Building sand | 90 cents per cubic yard | |
| Aug. 10 | Grove Lime and Coal Co. | Lime | 46¼ cents per barrel | Do. |
| Aug. 10 | James H. McCuen | 1 and 2 inch broken stone. | $1.74 per cubic yard | Do. |
| Aug. 11 | The Cranford Paving Co. | 2-inch broken bricks | $1.89 per cubic yard | Do. |
| | | 1-inch broken bricks | $2.05 per cubic yard | |
| Aug. 16 | Excelsior Terra Cotta Co. | Ornamental terra cotta. | Estimated amount, $27,951.61 | Do. |
| Aug. 17 | The Frederick Brick Works of Frederick County. | Brick | Estimated amount, $60,000 | Do. |
| Aug. 21 | Potomac Terra Cotta Co. | Terra-cotta conduit | Estimated amount, $1,312.50 | Completed. |
| Aug. 21 | The Burnet Co | Electrical supplies | Estimated amount, $4,665.47 | In force. |
| Aug. 22 | Cutter Electrical and Manufacturing Co. | Switches and switch boxes. | Estimated amount, $3,924.40 | Do. |
| Aug. 23 | Jas. H. McGill | Nonstaining Portland cement. | $3.09 per barrel | Do. |
| Sept. 1 | Addison H. Clarke | American Portland cement. | $1.64 pér barrel, net | Do. |
| Sept. 13 | J. P. Falt | Cut stone | Estimated amount, $64,871.50 | Do. |
| Sept. 17 | Brown-Ketcham Iron Works. | Cast-iron frames | Estimated amount, $104,239.59. | Do. |
| Oct. 23 | do | (Supplemental and modifying contract of Sept. 17, 1900.) | Reduces estimated amount of original contract $1,760.92. | Do. |
| Sept. 17 | Chas. E. Ellicott | Cast-iron column guards. | Estimated amount, $6,021.51 | Do. |
| Sept. 18 | Cribben & Sexton Co. | Enameled pipe: | | |
| | | 1¼-inch, 13 inches long. | 50 cents per piece | Do. |
| | | 3-inch, 13 inches long. | 88 cents per piece | Do. |
| | | 2-inch, 7 feet 3 inches long. | $3.65 per piece | Do. |
| Sept. 18 | Geo. W. Knox Express Co. | Transporting white sand. | $2.25 per ton of 2,000 pounds | Do. |
| Sept. 24 | Crystal Sand Co | White sand | 70 cents per ton of 2,000 pounds. | Do. |
| Oct. 31 | Seneca Stone Co | Cut stone | Estimated amount, $1,560 | Do. |
| Nov. 5 | Cuyler & Mohler | Pipe, fittings, etc | Estimated amount, $15,412.94 | Completed. |
| Nov. 20 | Brennan Construction Co. | Tile roofing | $2,100 | Do. |
| Nov. 13 | J. C. McFarland & Co. | Corrugated roofing | $1,089 | Do. |
| Nov. 12 | Arthur E. Rendle | Skylights | $1,579.20 | Do. |
| Dec. 18 | H. S. Pilkington & Co. | Mortar color | $900 | In force. |
| 1901. | | | | |
| Jan. 21 | Cuyler & Mohler | Pipe and valves | Estimated amount, $8,721.72 | Completed. |
| Feb. 1 | The C. J. McCubbin Co. | Fittings, pipe hangers, and clamps. | Estimated amount, $1,367.46 | Do. |
| Mar. 28 | C. A. Schneider's Sons. | Steel water tanks | $2,508 | In force. |
| Apr. 25 | Pawling & Harnischfeger. | Electric traveling crane. | $4,900 | Do. |
| June 6 | Charles E. Ellicott | Insulator clamps | Estimated amount, $3,043.97 | Do. |
| June 7 | The Burnet Co | Porcelain insulators | Estimated amount, $3,808.35 | Do. |
| June 7 | New Jersey Foundry and Machine Co. | Cable supports | Estimated amount, $4,320 | Do. |
| June 10 | Cuyler & Mohler | Pipe and fittings | Estimated amount, $254.50 | Do. |
| June 13 | H. C. Roberts | Bolts and washers | Estimated amount, $162.41 | Do. |
| June 26 | American Mason Safety Tread Co. | Safety treads | Estimated amount, $3,520 | Do. |
| June 27 | New Jersey Foundry and Machine Co. | Ventilating registers and 2 steel tanks. | Estimated amount, $2,511.24 | Do. |
| (a) | Mason Regulator Co | 2 steam-reducing valves. | $200 each | Do. |
| (a) | Charles E. Ellicott | Steam-heating coils | Estimated amount, $17,946.89 | Do. |
| (a) | Brown-Ketcham Iron Works. | Steel ladders | Estimated amount, $831 | Do. |
| (a) | The Champion Iron Co. | Stair work | Estimated amount, $16,304 | Do. |
| | | Manhole covers, etc | Estimated amount $1,393.06 | |
| | | Cast-iron drinking fountain frames, etc. | Estimated amount, $159 | |

[a] Contract papers in process of execution.

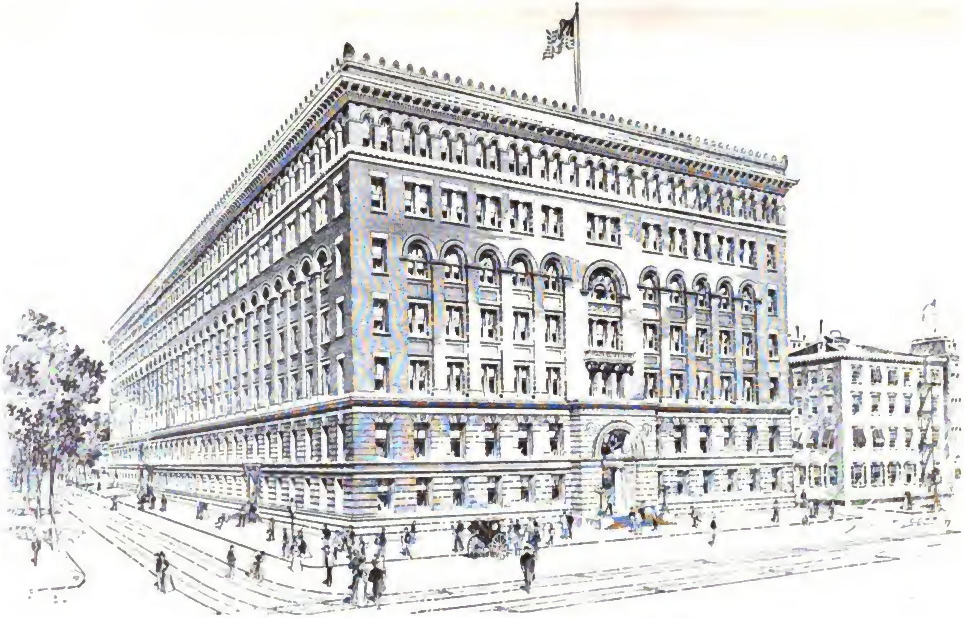
It is respectfully recommended that the drawings published in the first report (House Doc. No. 32, Fifty-sixth Congress, first session), and the photographs submitted, but not published with the second report (House Doc. No. 25, Fifty-sixth Congress, second session), be all reproduced with this report, as it will add greatly to its value to those who are interested in the details of the work. With the next annual report will be submitted a few selected drawings and photographs, which, taken with the reports and drawings and photographs already submitted, will give a complete and intelligible history of the entire building.

In closing, I wish to acknowledge the efficiency of my entire office force, both in the preparation of plans and in keeping with great accuracy the complicated accounts and records necessary in carrying on a work of the magnitude of the new building for the Government Printing Office, partly by hired labor and partly by separate contracts. These accounts and records show not only all disbursements, but the expenditure of all materials and labor in such detail that accurate unit costs can readily be determined from them. Among the draftsmen, Mr. Ewald Schmitt, chief draftsman, and Mr. R. E. Bakenhus, principal assistant draftsman, are deserving of special mention. Among the clerical members of the force, Mr. James C. Bourke, chief clerk; Mr. Walter T. Austin, bookkeeper, and Mr. Samuel R. Moore, voucher clerk, should also be specially mentioned. I also wish, before closing, to express my appreciation of the uniform courtesy experienced at the hands of Hon. Frank W. Palmer, Public Printer.

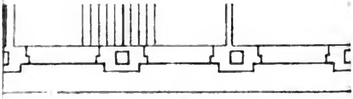
Very respectfully, your obedient servant,

JOHN STEPHEN SEWELL,
*Captain, Corps of Engineers.*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*



NEW BUILDING FOR GOVERNMENT PRINTING OFFICE.



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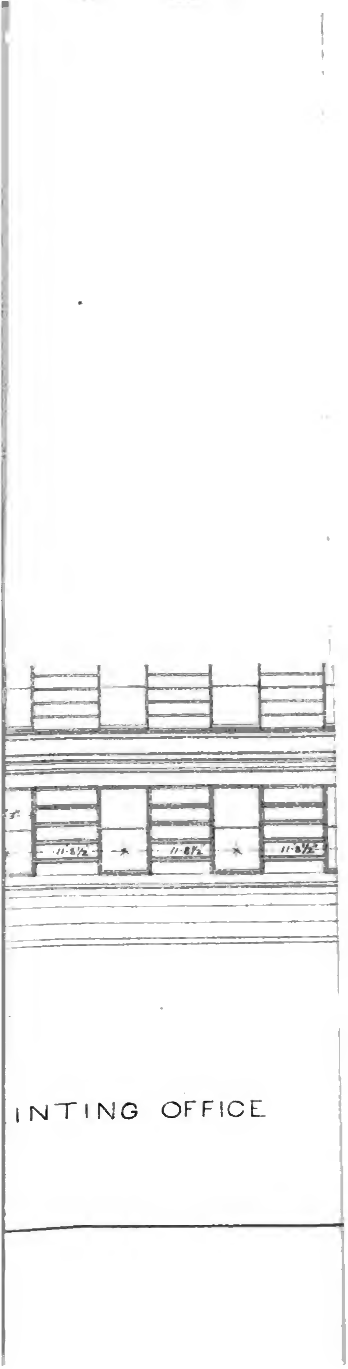

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# APPENDIX III.

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## CONSTRUCTION OF MILITARY ROAD FROM FORT WASHAKIE TO MOUTH OF BUFFALO FORK OF SNAKE RIVER, WYOMING.

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### *REPORT OF CAPT. H. M. CHITTENDEN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

UNITED STATES ENGINEER OFFICE,
*Sioux City, Iowa, July 2, 1901.*

GENERAL: I have the honor to transmit herewith report upon military road from Fort Washakie, Wyo., to mouth of Buffalo Fork of Snake River for the fiscal year ending June 30, 1901.

Very respectfully, your obedient servant,

H. M. CHITTENDEN,
*Captain, Corps of Engineers, U. S. A.*

Brig. Gen. G. L. GILLESPIE,
*Chief of Engineers, U. S. A.*

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### REPORT ON CONSTRUCTION OF MILITARY ROAD FROM FORT WASHAKIE TO MOUTH OF BUFFALO FORK OF SNAKE RIVER, WYOMING.

Description of the locality, character and value of the road, and work done to June 30, 1899, are described in the Annual Report of the Chief of Engineers, 1899, Part VI, pages 3881-3900.

The sundry civil appropriation act of June 6, 1900, provided for further road work as follows:

> Military road, Wyoming: For the repair, construction, and completion of the military road from Fort Washakie to near Jacksons Lake, in Uinta County, Wyoming, authorized by provision in the sundry civil appropriation act approved June fourth, eighteen hundred and ninety-seven, ten thousand dollars.

A project for expenditure of the above was approved June 22, 1900, and work was begun immediately after the 1st of July, when the appropriation became available. A party was organized under Mr. F. L. Walker, foreman, and set to work at the west terminus of the road. The party left Mammoth Hot Springs on the 2d of July and reached Buffalo Fork of Snake River on the 7th. It was at this point that the most important work of the season was done. A strong bridge was built over this stream, which had hitherto been passable only by a difficult ford. The bridge was built entirely from timber hewn on the ground. It is 117 feet long, in three spans, with 12 by 12 inch stringers, five to each span. The clear roadway is 14 feet 4 inches. The abutments are 18 feet long, drifted into the bank with 18-foot logs. The piers are 18 by 7 feet, pointed on the upstream ends. All parts of the piers and abutments are thoroughly drifted together, and the interiors are completely filled with rock. The floor is made of split logs 8 to 10 inches in diameter, adzed off to make a level roadway. This work was completed on the 28th of July. Three illustrations[1] of the completed work accompany this report.

In order to secure a good location for this bridge it was necessary to move upstream from the ford 3,500 feet and to build in all something over 4 miles of new road. This work was done while the bridge was being built.

The rest of the work during the season consisted in completing and repairing the road as previously built. This work was carried over the entire length except about 3 miles at the east end, which will probably be abandoned in favor of a new location. An important feature of this work was the cutting out of a bad hill near the western end of the road, in the vicinity of what is called the "Joe Smith Ranch." This was an exceptional case where cutting out a hill shortened the road. The distance gained was about 1,200 feet, and the very heavy grades were entirely removed.

The work of the party was suspended on the 13th of September and the return to Mammoth Hot Springs was begun.

During the month of October Mr. S. F. Crecelius and Foremen F. L. Walker made a reconnaissance along the Wind River Valley to determine the best location of the road over the remainder of the distance to Fort Washakie, in case further appropriations were made for the work. Mr. Crecelius was also instructed to look into the matter of unauthorized changes of the existing road by private parties. The report of his reconnaissance is appended.[1]

The entire line of the military road from Fort Washakie to Jackson Lake was examined by the officer in charge between August 26 and August 27, 1900.

The balance of the appropriation still remaining in hand will be expended during the ensuing season.

Some criticism has been made of the location of that portion of the military road between Fort Washakie and Jackson Lake which was built in 1898, but this has arisen from an entire ignorance of the purposes for, and conditions under, which the work was done. The sum available was only $10,000. The distance from a base of supplies was on the average 125 miles. The length of road to be opened was 53.8 miles, and the time in which to organize a force and do the work only about two months. To locate and build the road as those are built in the Park would require at least $100,000. It was therefore an imperative necessity to disregard the best location and go where a road could be opened with the least work. The feat of getting through at all was a most creditable one, and the fact that the location is not what a thorough survey and ample funds for construction would have determined should not detract from it in the least.

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[1] Not printed.

### *Cost of work, season of 1900.*

| | |
|---|---|
| Road work | $6,512.71 |
| Bridges | 764.65 |
| Surveys | 382.50 |
| Administration | 743.77 |
| | 8,403.63 |

### *Money statement.*

| | |
|---|---|
| July 1, 1900, balance unexpended | $10,025.12 |
| June 30, 1901, amount expended during fiscal year | 8,392.97 |
| July 1, 1901, balance unexpended | 1,632.15 |
| July 1, 1901, outstanding liabilities | 19.19 |
| July 1, 1901, balance available | 1,612.96 |

# APPENDIX J J J.

## ERECTION OF A MONUMENT TO SERGEANT CHARLES FLOYD.

### *REPORT OF CAPT. H. M. CHITTENDEN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1901.*

United States Engineer Office,
*Sioux City, Iowa, June 30, 1901.*

General: I have the honor to submit herewith my annual report for the fiscal year ending June 30, 1901, upon the erection of a monument to the memory of Sergeant Charles Floyd. It is also a final report, the work having been completed and all the accounts closed.

Very respectfully, your obedient servant,

H. M. Chittenden,
*Captain, Corps of Engineers, U. S. A.*

Brig. Gen. George L. Gillespie,
*Chief of Engineers, U. S. A.*

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## REPORT ON ERECTION OF A MONUMENT TO SERGEANT CHARLES FLOYD.

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### DESIGN FOR THE FLOYD MONUMENT.

Owing to the small amount of funds available for this work and the character of the situation where the monument was to stand, it was considered that a plain shaft would produce the best result that could be expected. The design selected was that of the Egyptian obelisk and its dimensions were to be controlled by the capacity of the funds to do the necessary work. In fixing upon the proportions for the monument the dimensions of existing ancient examples were carefully studied to determine if possible the rule followed in these works. The three elements upon which the form and appearance of an obelisk depend are (1) the ratio, $r$, of tne total height, $h$, to the side of the base, $b$; (2) the ratio of the side ot the top of the main shaft to that of the base; (3) the ratio of the height of the pyramidion to the side of the base of the shaft. In regard to (2) and (3) there is much uniformity in the classic models, though by no means absolute. The value of (2) is approximately two-thirds and that of (3) is approximately unity—that is, the side of the top of the main shaft is two-thirds that of the base, and the height of the pyramidion is equal to the side of the base. The value of (1) is exceedingly variable and in twenty-one examples of the larger obelisks, whose dimensions are given by Gorringer, it ranges from 7.9 to 12.5. No definite relation seems to exist between this ratio and the height of the obelisk except that on the whole it increases with the height. This would in fact naturally result from the requirements of stability, for, with the same material and wind pressure, the higher the monument the smaller may be the base in proportion to the height.[1]

Apart from these theoretical considerations, the results of experience seem to indicate that a height ranging from ten to twelve times the base gives a more satisfactory artistic effect than any smaller value. How far the appearance of a monument may be injured by disregarding these classic proportions may be seen in the three examples in the accompanying cut which are all reduced to the same height. They are the Washington Monument, the highest in the world; the Bennington Battle Monument, second highest in the United States; and the Bunker Hill Monument. Their heights in full numbers are respectively 555 feet, 306 feet, and 221 feet. In the Washington Monument $r = 10$, and the base and height of pyramidion = $\frac{5}{8}$ $b$ and $b$ respectively. The proportions have been universally recognized as satisfactory. In the Bennington monument $r = 8.3$, and there is no pyramidion, the lines of the main shaft gradually curving off from middle height to a point at the apex. In the Bunker Hill Monument $r = 7.4$ and the base and height of pryamidion seem to be the same and each equal to $\frac{1}{2}$ $b$. The difference of appearance in these three examples is very marked and wholly to the advantage of the Washington Monument.

In regard to wind pressure it is a common practice to assume a force of 50 pounds per square foot as an absolutely safe allowance. Undoubtedly, in the case of an obelisk, this is larger than is is necessary. While actual pressures as great as this have been recorded on small surfaces, it is very doubtful if they are ever developed simul-

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[1] Let $b$ = side of base = height of pryamidion.
Let $r$ = ratio of total height to base.
Let $h = rb$ = total height.
Let $\frac{5}{8}b$ = side of main shaft at top.
Let $p$ = wind pressure in pounds per square foot.
Let $w$ = average weight of the monument per cubic foot of volume within the exterior lines.

Let the condition of stability be such that the line of resultant pressure from $p$ and $w$ shall fall at the limit of the middle third of the base—that is, that the factor of safety against overturning shall be three. The following formula will then result:

$$b = \frac{7\,r^2 - 8\,r + 3}{19r - 15} \times \frac{9\,p}{w}$$

Knowing the value of $w$ and assuming a value for $p$, the proportion and size of a monument for any desired height directly results. Upon the accompanying diagram are curves for $h$ and $b$ corresponding to $w = 145$ and $p = 40$. By means of the rules printed on the diagram the values of $h$ and $b$ corresponding to any other assumed values of $w$ and $p$ can be readily determined. The curves show that the ratio $r$ increases with $h$.

While the above equation will give the true economic relation between the base and height of an obelisk within all practicable limits of weight and wind pressure, and for an ample factor of safety against overturning, it is not likely that for the higher obelisks it would give the most desirable result from an artistic point of view. For an obelisk of the height of the Washington Monument it is evident that a much more slender structure would have ample stability, but whether it would produce as satisfactory an effect is difficult to say in the absence of any actual example. There is another element that might also enter if it were attempted to erect a very high structure on these strictly theoretical proportions. It might be found that the weight of the shaft would produce a pressure per square foot at the base beyond the safe resisting power of the rock. On the other hand, the total weight being less, a smaller and less expensive foundation would be required.

taneously over an entire surface as large as that of the face of a high obelisk, and in a direction perpendicular to it. Where high chimneys have yielded to the force of the wind, it does not seem to have been from overturning, but from a gradual disintegration of the masonry, due to the changing pressure on the joints. Figured with a factor of safety of three, the limiting pressures on such of the ancient obelisks as exceed 50 feet in height vary from 19 to 50 pounds per square foot. These are all monoliths, and there appears to be no record of any of them having been blown over. It is entirely probable that 30 pounds would be in all cases a perfectly safe limit in case of a structure of the form of an obelisk. Owing to the cyclonic character of summer storms in the Missouri Basin, a pressure of 40 pounds has been assumed for the Floyd Monument.

There is one supposed feature of the ancient obelisks which has been exploited a great deal, but which has probably no foundation in fact. It is claimed that the true classic model shows a slight swell on the various faces, and that this was designed to correct disadvantageous optical effects, which a perfectly plane surface produces on the eye. So far as the recorded measurements of these monuments go, the foundation for this belief would seem to be very shadowy. Such variations from a plane surface as do appear are rarely uniform, even on the different faces of the same shaft. They exhibit no sign of a common purpose. They may have resulted from the action of the elements through many centuries, or from released initial strains to which the stone was subjected in the quarry. In any event, the belief that these variations, from a true plane, were the result of original design has very little evidence to support it.

In fixing upon the final proportions for the Floyd Monument, the value of $r$ was left undetermined until the particular stone to be used was selected. A height of 100 feet was decided upon, if possible of attainment within the funds of the association. Plans and specifications were drawn on this basis and proposals were invited. The stone finally selected, together with the concrete core, gave an average weight for the shaft of 145 pounds per cubic foot. This figure, with 40 pounds wind pressure, gave for $r$ a value of 10.65, and for $b$ a value of 9.42 feet. The exact height adopted was 100.325 feet. In the course of construction a small amount of this height was lost from scant thickness of the joints or stones, and the actual height of the completed work is 100.174 feet above the base.

In planning the masonry for the work, it was decided to have six pieces in each course, of equal length, breadth, and thickness, the two interior pieces differing from the four corner pieces only in the batter of the ends. The length of the stone being thus determined, the breadth and thickness were taken according to the most approved proportions for building stones. This gave as the dimensions of the stones in the lower course 56⅜ inches by 27⅛ inches by 18 inches. As the main shaft diminishes by one-third from the base to the top, all of the dimensions of the stones were made to diminish in like proportion. The vertical joints were given a proper batter, so that they are all on straight lines converging toward the central line of the shaft. The same convergence was continued up the pyramidion to the apex, the effect being carried out by false joints when the stones became too small to be further divided. The masonry, as thus planned, left a space or core in the center which it was decided to fill with concrete.

The foundation was planned so as to keep the ordinary pressure upon its bed within 1¾ tons per square foot. Experience has shown that the peculiar soil which constitutes the Missouri River bluffs in this locality will stand from 1½ to 2 tons per square foot without appreciable yielding. It was decided to make the foundation of concrete, with a single base course of heavy stone between it and the lower course of the monument. The bottom of the foundation was fixed at 22 feet square, and the sides were carried up vertically for the distance of 1 foot. The rest of the mass was in the form of a frustum of a pyramid, the base being 22 feet square, the top 13.6 feet square, and the height 10.05 feet. The full depth of the concrete foundation was therefore 11.05 feet. The total weight of the structure, including foundation, is about 717 tons, while the weight of the earth and pavement vertically above the bed of the foundation is about 127 tons, making 844 tons in all, or 1.74 tons per square foot of bed. A uniform wind pressure of 40 pounds against the face of the obelisk will increase this pressure on the leeward side to 2.23 tons per square foot. At the present time the settlement of the foundation has amounted to three-eights of an inch and has been absolutely uniform.

To strengthen the foundation against possible breaking near the edges a course of steel rails (60 pounds) 16 in number was laid radially 1 foot above the bottom of the foundation, and a similar course 1 foot below the top. For the more complete protection against the infiltration of water around the base of the monument, which is the only danger to be feared in a soil of this character, a solid concrete pavement was planned to extend from the shaft to the circumference of a circle whose radius is 49.295 feet. The inner portion of this pavement forms a terrace bounded by a slope of 1 on 2, the exterior dimensions of which form a square of 42 feet. The outer portion of the pavement is a roadway encircling the monument, 3 feet below the level of the terrace, sloping toward the foot of the terrace. The surface water falling on the monument or pavement is carried off in a small gutter extending around the foot of the terrace and emptying into a 4-inch drain pipe which passes under the pavement and well beyond its limits. A flight of steps for the ascent of the terrace is provided opposite each face of the shaft. The accompanying plan and profile show the arrangement.

On the east and west faces of the shaft it was decided to place two bronze tablets bearing suitable inscriptions.

Around the monument and firmly set in the pavement a steel picket fence, with upper points bent outward and sharpened, was provided for the better protection of the monument from vandalism.

## EXECUTION OF THE WORK.

By resolution of the Floyd Memorial Association, April 5, 1900, Captain Chittenden was appointed engineer for the association for the erection of the monument, including both the State and national appropriations. Under date of May 31, 1900, the State commissioners ratified this appointment. The consent of the War Department was obtained May 5, 1900, for the execution of the State's portion of the work through the United States engineer office in Sioux City and the entire work was thus placed under the direction of that office.

The expenditure of the Government appropriation had already been placed in the charge of the United States engineer office at Sioux City by instructions from the office of the Chief of Engineers dated March 23, 1899. The work was under the supervision of Capt. J. C. Sanford, Corps of Engineers, until October 17, 1899, since which date it has been in the charge of Capt. H. M. Chittenden, Corps of Engineers.

The general design of the monument having been approved by the Floyd Memorial Association and accepted by the Secretary of War, steps were taken to proceed with the erection.

### CONSTRUCTION OF FOUNDATION.

It was decided to construct the foundation by hired labor rather than by contract, in order to insure a more direct and satisfactory control of the work. The materials used in the concrete of the foundation were "Atlas" Portland cement, bank sand of excellent quality obtained from Waterbury, Nebr., and crushed rock from the Sioux Falls granite quarries. The proportions used were: 1 cement, 2.37 sand, and 4.37 crushed rock. Water had to be hauled nearly a mile. The quantity of concrete in the foundation was 138.6 cubic yards. It was desired to have the whole mass put in in a single day so that it might set as a monolith. Hand mixing was necessary because the quantity was not sufficient to justify procuring a mechanical mixer. It therefore became necessary to assemble a working force of over 100 men for a single day's work. By utilizing the Government force at work on the river and the Sioux City force at work on the streets, the requisite number was raised without serious difficulty. Every detail of the work was carefully planned beforehand so that no time should be lost. The Sioux City and Pacific Railroad furnished a passenger train and the entire force left the Sioux City station at 7 a. m. for the monument site, some three miles distant. The first shovelful of concrete was deposited at 7.30 a. m. and the last at 5.20 p. m. The weather was perfect and the whole proceeding passed off without a hitch. The quality of the concrete was first class and ought to give a foundation as indestructible as granite itself. This work was done on the 29th of May, 1900.

### THE DIMENSION STONE.

A careful set of specifications and drawings for the dimension stone was prepared and bids were asked from various quarry owners and operators west of the Mississippi and from three east. A sample showing the precise finish proposed was required of each. The bids were opened on the 31st of May, 1900, eight bids being received. The result of the bids was to show that only two kinds of stone would fall within the means of the association, if the monument were to be 100 feet high. These were the Kettle River sandstone of Minnesota and the buff oolitic limestone of Bedford, Ind. The price of the sandstone was slightly less than that of the limestone, while the cost of transportation was considerably less because free transportation had been conceded from the quarry to the site of the monument. The stone itself is of excellent quality. Its crushing strength is 12,547 pounds per square inch. It is used extensively in the severe northern climate of Minnesota where it is subjected to the most extreme conditions of heat and cold. It is also used extensively for paving blocks. Its record as a building stone was carefully investigated and found to be satisfactory. There was nothing to show that it was not a thoroughly durable stone. Its color is a pleasing one, though probably not so desirable as that of limestone or the finer granites. Taking all things into consideration the association decided to adopt the sandstone, and a contract was accordingly entered into June 26, 1900, on the part of the State of Iowa with the Minnesota Sandstone Company. The total number of pieces in the monument was 463, the largest (base course immediately under lowest course of shaft) containing 41.8 cubic feet and the smallest 2.5 cubic feet. The face finish was patent-hammered ten-cut and the beds were dressed for quarter-inch joints. The contractors were held rigidly to the specifications, and as they appear to have underestimated the character of the requirements they undertook more than they could accomplish within the amount of their bid. They nevertheless completed the contract to the satisfaction of the association except in the matter of time, but at a loss to themselves estimated at $1,500. The stone was throughout a thoroughly fine lot and very little difficulty was encountered from defective dimensions, imperfect beds, etc., during erection. The contract was completed November 17 and payment made December 6, 1900.

### ERECTION.

Under a separate but equally rigid set of specifications proposals were invited for the work of erection of the monument, and on July 16, 1900, a contract was entered into on the part of the United States with Hansen Brothers, of Sioux City, Iowa. The corner stone of the monument was laid with appropriate ceremonies August 20, 1900, the ninety-sixth anniversary of Floyd's death. At the same time the remains of Sergeant Floyd were deposited on the concrete foundation in the center of the base course and permanently buried in the concrete of the core. The work of erection proceeded thereafter as rapidly as the delivery of the stone would permit until November 14, when it was suspended on account of cold weather. At this time the shaft had reached a height of 55 feet. Work was resumed on the 28th of March, 1901, and was pushed as rapidly as the weather would permit. A great deal of annoyance and considerable delay was experienced from high winds. The work was completed, however, very nearly within the time intended. The capstone of the monument was laid April 22, and the entire work on the shaft was completed, the pavement around the base finished to the foot of the terrace, the steel fence erected, the tablets placed in position, and the roadway to the public highway constructed before May 30, the day set for dedication of the monument.

The steel fence is 7½ feet high, consisting of vertical bars of 1-square-inch cross section, bent outward at the top and sharpened. Every fourth upright is set 1 foot deep in the pavement. The other pickets come within 1½ inches of the pavement. The pickets are united and supported by three lines of double thick strap iron, $\frac{5}{16}$ by 1⅜ inches in cross section, permanently riveted together. This fence was erected by Hermann & Savage, of Sioux City, Iowa, at a cost of $360.

The bronze tablets on the east and west faces of the monument were cast by the Gorham Manufacturing Company, of New York. They cost, in place, $650. They contain the inscriptions shown in the accompanying cuts.

The site of the monument is distant 610 feet from the nearest public highway. Although the development of the Floyd Park by the city will come in time, it was thought that a certain amount of work ought to be done at once in order to give the public safe and easy access to the monument. Accordingly, with the aid of the city, the grounds in the immediate vicinity of the monument were graded to a more regular surface and a graveled roadway 18 feet wide was built to the pavement around the monument.

### DEDICATION.

On the 30th of May the monument was formally dedicated. The Floyd Memorial Association, in cooperation with the city of Sioux City, Iowa, the General Hancock Post, G. A. R., and other local organizations, prepared an elaborate and impressive ceremonial by which the entire day was devoted to a celebration of the completion of the work.

Work upon the pavement around the monument was resumed immediately after the dedication and was completed on the 27th of June. The grounds were cleared up and the entire work finished on the 29th of the month. The official connection of the United States Engineer Office with the work was closed on the 30th of June, by the resignation of Captain Chittenden of his position as engineer for the association and the turning over to the association of the unexpended balance remaining in his hands.

The greater part of the detailed execution of the work has been done by Mr. Bathurst Smith, assistant engineer, who followed the work with the utmost care from the beginning to the end. The Floyd Memorial Association formally recognized his valuable services as well as the general assistance of the United States Engineer Office by an appropriate resolution.

*Money statement.*

| | |
|---|---|
| Amount expended to June 30, 1900 | [1]$1,231.92 |
| July 1, 1900, balance unexpended | [2]3,768.08 |
| June 30, 1901, amount expended during fiscal year | 3,768.08 |

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[1] Decrease of $95.25 from amount stated in 1900 report on account of sale of tools.

[2] Increase of $95.25 over amount stated in 1900 report. Treasury transfer settlement No. 15608, June 28, 1900, credited to appropriation November 19, 1900.

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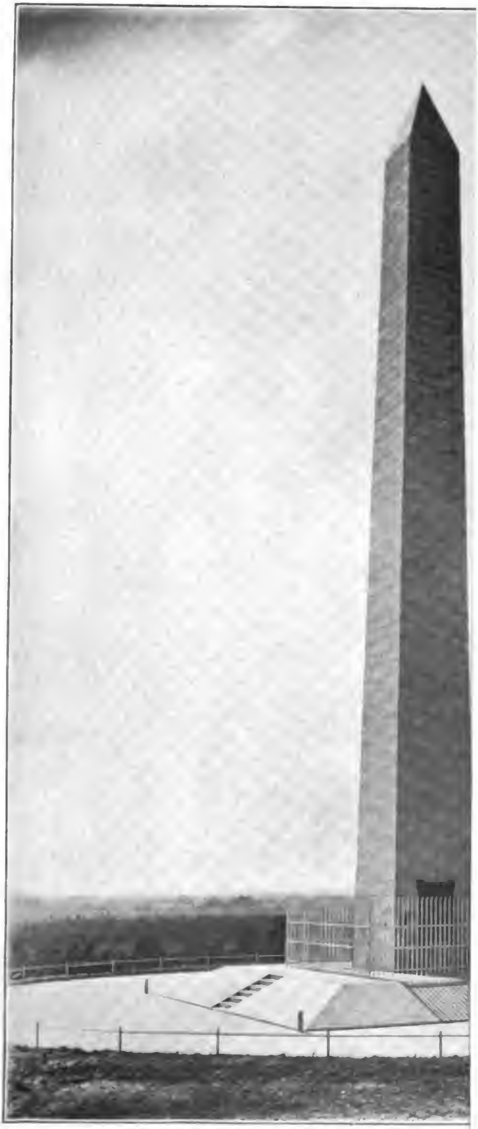

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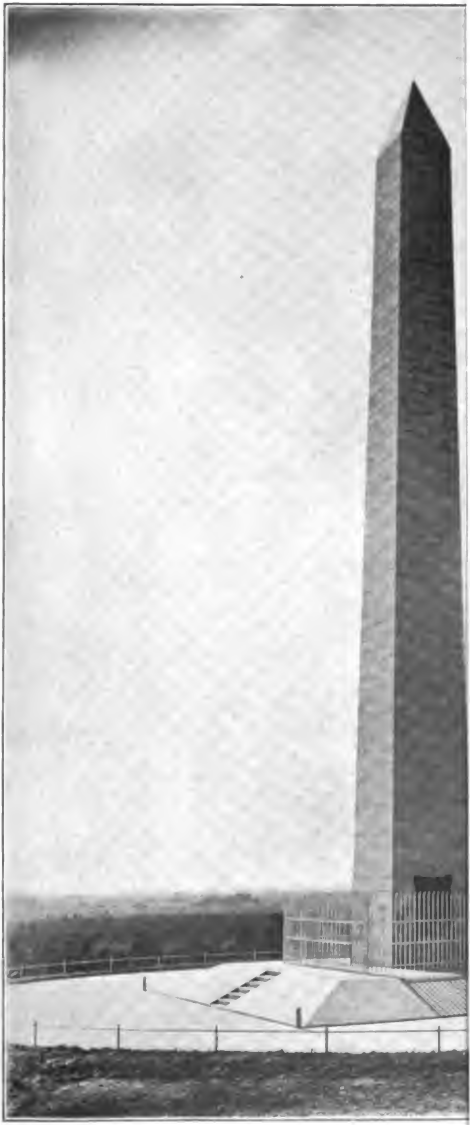

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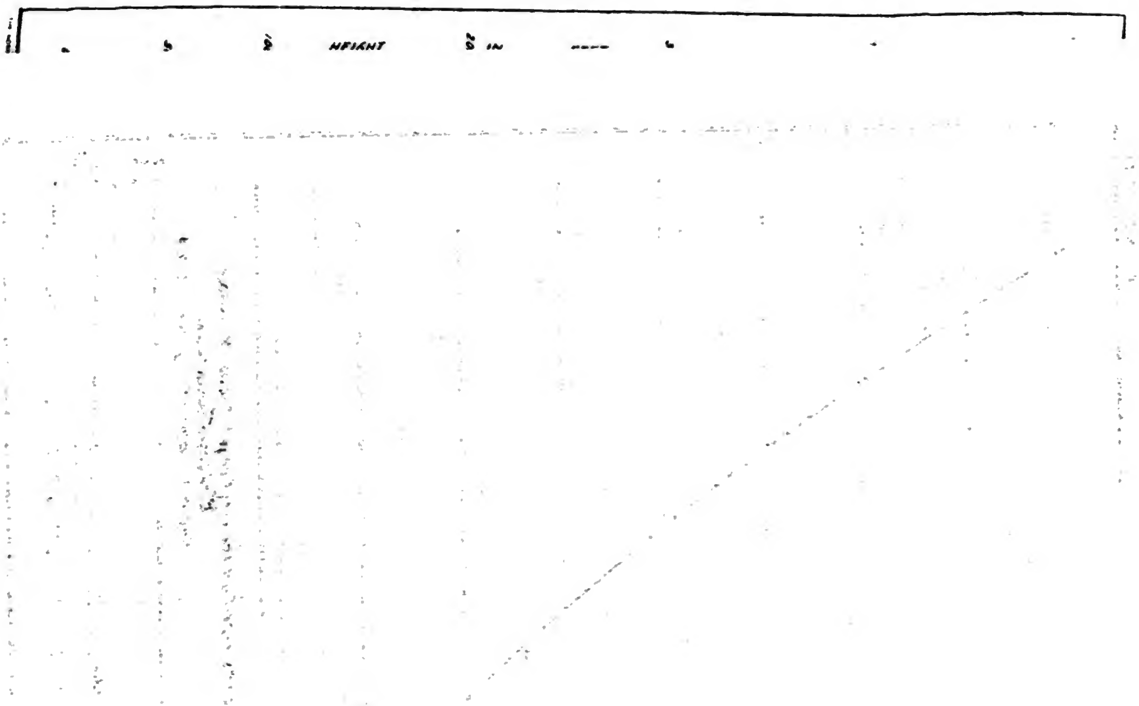
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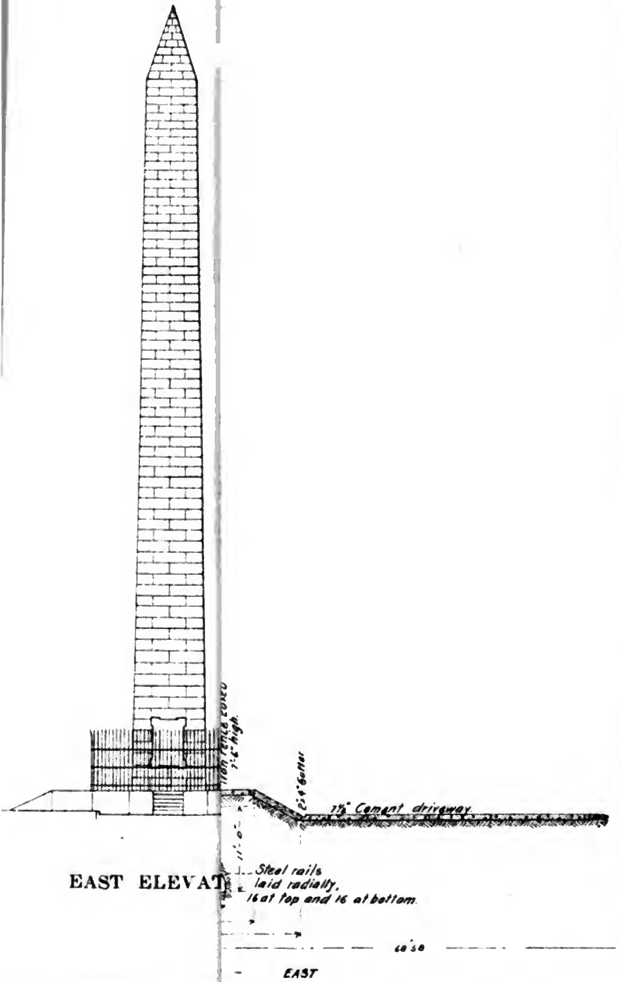

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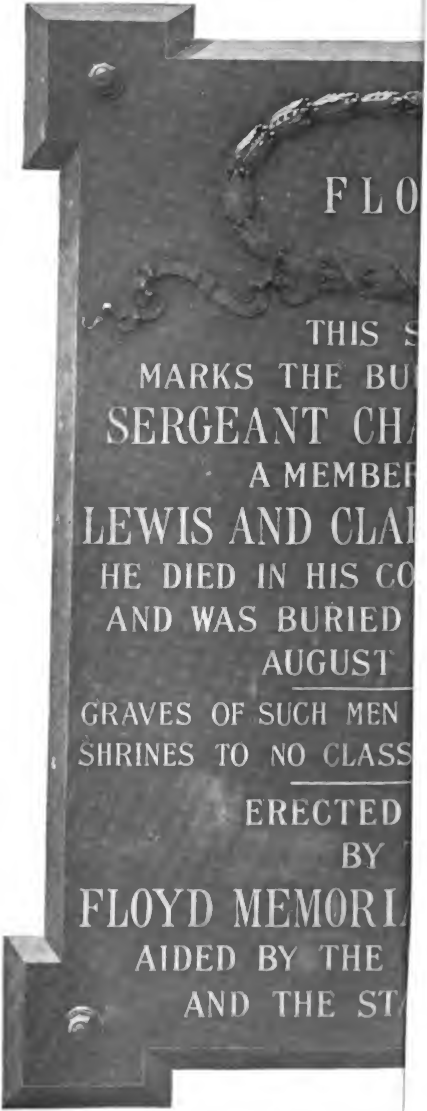

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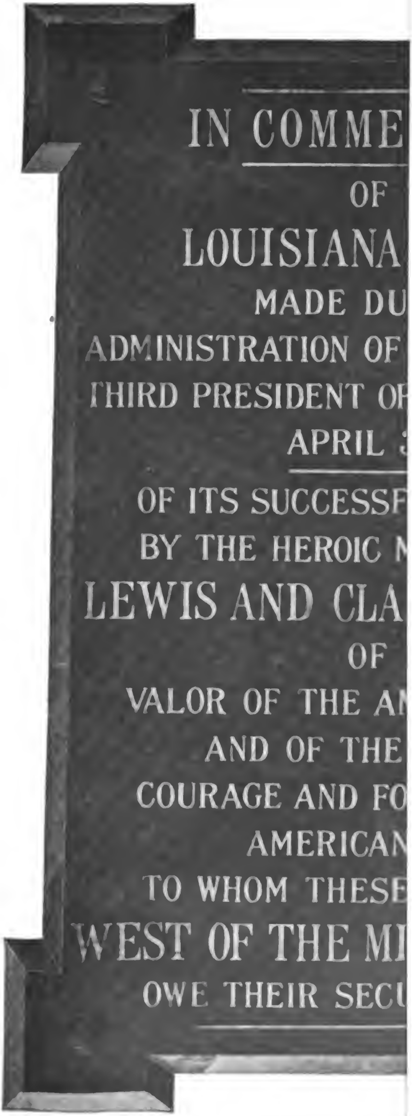

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# LAWS

AFFECTING

# THE CORPS OF ENGINEERS,

UNITED STATES ARMY,

FIFTY-SIXTH CONGRESS, SECOND SESSION,

1900-1901.

# LAWS

AFFECTING

# THE CORPS OF ENGINEERS, UNITED STATES ARMY.

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## FIFTY-SIXTH CONGRESS, SECOND SESSION, 1900-1901.

## PUBLIC ACTS.

**CHAP. 6.—An Act To amend an Act authorizing the construction of a bridge across the Mississippi River at Dubuque, Iowa, approved March sixth, nineteen hundred.**

December 21, 1900.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section two of an Act authorizing the construction of a bridge across the Mississippi River at Dubuque, Iowa, approved March sixth, nineteen hundred, is hereby amended by striking out the words "two hundred" and inserting in lieu thereof the words "one hundred and seventy-five."

Bridge of Dubuque and Wisconsin Bridge Co., over the Mississippi River at Dubuque.

Length of spans changed.

Laws, 1st session, 56th Congress, p. 41, amended.

Approved, December 21, 1900.

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**CHAP. 11.—An Act Permitting the building of a dam across the Osage River at the city of Warsaw, Benton County, Missouri.**

January 14, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the consent of Congress is hereby granted to the city of Warsaw, being a city incorporated and organized under the laws of the State of Missouri, its successors or assigns, to construct, erect, and maintain a dam across the Osage River, in Benton County, in the State of Missouri, at said city of Warsaw, and all work necessarily incident thereto: *Provided*, That the said city of Warsaw, its successors or assigns, shall make such change and modification in the works as the Secretary of War may from time to time deem necessary in the interest of navigation, at its own cost and expense: *Provided further*, That in case any litigation arises from the building of said dam, the maintaining of the same, or from the obstruction of the said river by said dam or appurtenant works, cases may be tried in the proper courts as now provided for that purpose in the State of Missouri and the courts of the United States.

Warsaw, Mo., may dam Osage River.

*Provisos.*

Changes in construction.

Litigation.

Amendment. Proviso. Fishways.

SEC. 2. That the right to amend, alter, or repeal this Act is hereby expressly reserved: *And provided further*, That suitable fishways shall be constructed and maintained at said dam by said city, its successors and assigns, as may be required from time to time by the United States Fish Commissioner.

Completion. *Provisos.* Hydraulic works not to be impaired. Damages.

SEC. 3. That this Act shall be null and void unless the dam herein authorized shall be completed within three years of the date hereof: *And provided further*, That such dam shall be constructed in such manner as not to injure or diminish the water power of any person or company having a dam or hydraulic works constructed: *And provided further*, That before the construction of said dam compensation shall be made to any person or company whose lands may be taken or overflowed in the construction or maintenance of such dam, in accordance with the laws of the State of Missouri.

Approved, January 14, 1901.

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January 26, 1901.

**CHAP. 181.—An Act To authorize the construction of a bridge across the Mississippi River at or near Grays Point, Missouri.**

Southern Illinois and Missouri Bridge Company may bridge Mississippi River. —location. Transit, etc. Tolls.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Southern Illinois and Missouri Bridge Company, a corporation created and organized under and by virtue of the laws of the State of Illinois, its successors and assigns, be, and the same are hereby, authorized and empowered to erect, construct, maintain, and operate a bridge and approaches thereto over the Mississippi River from a point on the Mississippi River in Alexander County, in the State of Illinois, opposite the terminus of the Saint Louis Southwestern Railway, at or near Grays Point, in Scott County, in the State of Missouri, or from some other convenient point on said river in said Alexander County, Illinois, to some opposite point on said river in the State of Missouri, within the distance of three miles above or below the terminus of said railway. Said bridge shall be constructed to provide for the passage of railway trains and, at the option of said corporation, its successors or assigns, may be so constructed as to provide for and be used also for the passage of wagons and vehicles of all kinds, for the transit of animals, and for foot passengers, for such reasonable tolls as may be approved from time to time by the Secretary of War.

Lawful structure and post route.

SEC. 2. That the bridge built, operated, and maintained under this Act, and subject to its limitations, shall be a lawful structure and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for the transportation of the same over the railroads or public highways leading to said bridge, and it shall enjoy the rights and privileges of other post roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridge and its approaches for postal-telegraph or for telephone purposes.

Telegraph, etc., companies.

SEC. 3. That any bridge built under this Act shall be a high bridge, with unbroken and continuous spans, and shall have at least one channel span, with a clear channel way at low water of not less than six hundred and fifty feet, and all other spans over the waterway, at a bank full stage, shall each have a clear channel way at low water of not less than five hundred feet, and all said spans shall have a clear headroom of not less than sixty-five feet, measured from extreme high water as determined at the location of the bridge, to the lowest part of the superstructure of the bridge or anything attached thereto: *Provided*, That such number of channel spans shall be built as may be recommended for the approved location by the board of engineers hereinafter provided, and that all channel ways shall be measured at right angles to the current of the river at the stage of water that is most important to navigation.

Spans, etc

*Proviso.* Channel spans.

SEC. 4. That all piers shall be built parallel to the current of the river at the stage of water that is most important to navigation; and the bridge itself shall be built as nearly as may be at right angles thereto; and that riprapping or other protection from imperfect foundations, which will lessen the required waterway, shall not be permitted; also that piers which would produce cross currents or bars dangerous to navigation shall not be constructed; and, if after construction, any piers or accessory works are found to produce the above-mentioned effects, or if any riprapping or other protection prohibited by this section is found to exist, the nuisance shall be abated or corrected in accordance with existing law.

Piers, etc.

SEC. 5. That the approaches to the bridge built under this Act shall be so designed and constructed as not to interfere with the free discharge of the river in seasons of flood; and any encroachment on the high-water cross sections by piers, solid embankments, or otherwise, which might result in unduly accelerating the high-water current at the site of the bridge shall not be allowed. If, by reason of the location of a bridge in or near a city harbor, or from any other cause, the channel span next the shore shall appear or become difficult of access at any season, because of the proximity of the river craft which are or may be moored at the bank, or from any other cause, then the person, company, or corporation owning, controlling, or operating said bridge shall either increase the width of the opening or span sufficiently, or shall, by purchase or otherwise, extinguish the right to obstruct the entrance to said span for a distance of from five hundred to one thousand feet above and below the bridge, as may appear necessary to the Secretary of War.

SEC. 6. That any person, company, or corporation constructing any bridge under authority of this Act shall

Aids to navigation.

build and maintain at all times, as accessory works to such bridge, such booms, piers, dikes, guard fences, and other devices as may be necessary to insure at all times a permanent channel for a sufficient distance above and below the bridge site, and for the guiding of rafts, steamboats, and other water craft safely under said bridge; and if at any time after the construction of the bridge and its accessory works the approaches to the channel spans in the bridge built under this Act are found to be dangerous or difficult of access by any important class of river traffic the nuisance shall be abated or corrected in accordance with existing law.

Plans, examination of, etc.

SEC. 7. That the said company shall submit in triplicate to the Secretary of War, for his examination, upon a convenient scale, a design and drawings of the bridge, piers, approaches and accessory works, and a map of the location, giving, for the space of at least two miles above and one mile below the proposed site, the topography of the banks of the river and the shore lines at high and low water, and this map shall be accompanied by another drawn on a scale of one inch to two hundred feet, giving, for a space of one-half mile above the proposed site and a quarter of a mile below, an accurate representation of the bottom of the river by contour lines two feet apart determined by accurate soundings, and also showing over the whole width of this part of the river the force and direction of the currents at low water, at high water, and at least one intermediate stage, by triangulated observations on suitable floats; and these maps shall also show the location of other bridges, coal tipples, cribs, and all other structures projecting into the river at bank-full stage, in the vicinity, and shall give such other information as the Secretary of War may require for a full and satisfactory understanding of the subject. Said maps and drawings shall be referred to the board of officers of the Corps of Engineers, United States Army, for examination and report, which board shall personally examine the site of the proposed bridge and shall hold a public session in the city of St. Louis, Missouri, to hear all objections thereto, of which public session due notice and invitation to be present shall be given to all interested parties by advertising, and such parties shall be allowed sufficient time for a full examination and consideration of the plans; and if said board of engineers reports that the location selected is unsuitable for a bridge, the bridge shall not be built at that location, or if said board reports that the plans presented are unfavorable to the interests of navigation at the site proposed the Secretary of War shall be authorized, on recommendation of said board, to refuse permission for the construction of a bridge at the proposed site until such changes in the design of the bridge or the location of its piers as may be deemed necessary shall have been made, and to require, in the same way, at the expense of the parties constructing such bridge, the construction of such dikes and other auxiliary struc-

Board to examine site, etc.

tures as may be needed for confining the flow of water to a permanent channel for a distance of not less than one mile above the bridge site for a proper distance below, but in no case shall there be a reduction in the width or headroom of channel or other spans, or in the arrangement and length of accessory works required by this Act, unless such reduction is made necessary by the physical characteristics of the river in the locality where the bridge is proposed, or is shown clearly to be not injurious to the interests of navigation; and the proposed bridge shall be a lawful structure only when built in accordance with the plans as recommended by the said board of engineers and approved by the Chief of Engineers, United States Army, and the Secretary of War, and while so managed and kept in repair as to offer at all times reasonable and proper means for the passage of rafts, steamboats, and other water craft under said bridge, and while all the requirements of this Act are observed.

Approval.

SEC. 8. That all persons, companies, or corporations owning, controlling, or operating the bridge authorized by this Act, shall maintain at their expense such lights and other signals on the bridge as may be required by the Light-House Board, as well as such other lights and signals as may be necessary for the security of navigation in the vicinity of the bridge; and shall also be required to maintain such indications of the stage of water and the headroom under the bridge as the Secretary of War may direct.

Lights.

SEC. 9. That all railroad companies desiring the use of any bridge constructed under this Act shall have, and be entitled to, equal rights and privileges relative to the passage of railway trains or cars over the same and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case the parties interested shall fail to agree upon the sum or sums to be paid and upon the rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall, upon the application of either party, be determined by the circuit court of the United States in and for any district in which any portion of said bridge may be.

Rights of railroads to use.

SEC. 10. That such alterations and changes as may be required by the Secretary of War, in accordance with existing law, in the bridge constructed under the provisions of this Act, so as to preserve free and convenient navigation, shall be made under the direction of the Secretary of War at the expense of the persons, companies, or corporations owning, controlling, or operating said bridge; and the fact that said bridge was constructed under the supervision of the United States shall not be held to be a bar to the enforcement of this requirement.

Changes.

SEC. 11. That the bridge constructed under the authority of this Act shall be built under the general supervision of the Secretary of War, and no changes or alterations in plans shall be made during construction of said bridge or after its completion unless said changes or alterations

Secretary of War to supervise construction.

Changes.

conform to the provisions of this Act and are recommended by the Chief of Engineers and approved by the Secretary of War. That during the original construction of said bridge, or in carrying out any authorized changes or repairs of said bridge, a navigable channel sufficient to accommodate the commerce of the river shall be preserved at all times at the site thereof, and the waterway of the river shall not be obstructed to a greater extent than is absolutely necessary, and such lights and buoys shall be kept on all cofferdams, piles, and other structures as may be necessary for the security of navigation; and any temporary obstruction or closing of any channel in customary use shall not be commenced until after due notice to navigation; and all cofferdams, piles, and other structures used in the construction or repair of said bridge shall be removed within a reasonable time after the completion or repair of said bridge.

Securing navigation during construction.

Amendment.

SEC. 12. That the right to alter, amend, or repeal this Act is hereby expressly reserved, and the right to require, at the expense of the owners, the entire removal of any bridge constructed under the provisions of this Act whenever Congress shall decide that the public interests so require is also expressly reserved; and the United States shall not be liable for damages arising from the exercise of the rights thus expressly reserved.

Commencement and completion.

SEC. 13. That if the construction of the bridge hereby authorized shall not be commenced within one year and be completed within three years from the date of approval of this Act, then this Act shall be null and void, and all rights hereby conferred shall cease and determine.

Approved, January 26, 1901.

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February 1, 1901.

**CHAP. 191.—An Act To provide for the construction of a bridge by the Fargo, Duluth and Northwestern Railroad Company across the Red River of the North at Fargo, North Dakota.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Fargo, Duluth and Northwestern Railroad Company, a corporation duly organized under the general incorporation laws of the State of North Dakota, its successors and assigns, is hereby authorized to construct and maintain a bridge across the Red River of the North at or near the city of Fargo, Cass County, North Dakota, and also to lay on and over said bridge a railway track or tracks for the passage of railway trains.

Fargo, Duluth and Northwestern Railroad may bridge Red River of the North at Fargo, N. Dak.

Secretary of War to approve plans.

SEC. 2. That said bridge should be constructed and built without interference with the security and convenience of navigation of said river beyond what is necessary to carry into effect the rights and privileges hereby granted; and in order to secure that object the said corporation shall submit to the Secretary of War, for his examination and approval, a design and drawings of the bridge, and a map of the location, giving, for the space of one-half mile above and one-half mile below the proposed location, the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the currents at all stages, and the soundings, accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plan and location of the bridge are approved by the Secretary of War the bridge shall not be built: *Provided*, That if the said bridge shall be made with unbroken and continuous spans it shall not be of less elevation in any case than fifty feet above extreme high-water mark as understood at the point of location to the lowest part of the superstructure of the bridge, nor shall the spans of said bridge be less than three hundred feet in length in the clear; and the piers of said bridge shall be parallel with the current of said river and the briuge itself at right angles thereto, and the main span shall be over the main channel of the river and not less than three hundred feet in length in the clear: *And provided also*, That if any bridge built under this Act shall be constructed as a drawbridge the same shall be constructed as a pivot drawbridge, with a draw over the main channel of the river at an accessible and navigable point and with spans of not less than one hundred feet in length in the clear on each side of central or pivot pier of the draw, and the next adjoining span or spans to the draw shall not be less than one hundred feet, and the headroom under all river spans shall not be less than ten feet above local high-water mark, and the piers of said bridge shall be built with the current of said river and the bridge itself at right angles thereto: *Provided also*, That said draw shall be opened promptly upon the reasonable signal for the passing of boats; and said company or corporation shall maintain, at its own expense, from sunset till sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe: *Provided also*, That said company shall, at its own expense, build and maintain, under direction and supervision of the Secretary of War, such wing dams and booms or other works necessary to maintain the channel within the draw spans of said bridge, and shall, at their own expense, maintain a depth of water through said draw spans not less than that now existing, as shown by the report of the War Department, at the point where said bridge may be located: *Provided also*, That all railway companies desiring to use said bridge shall have and be entitled to equal rights and privileges in the passage of the same, and in the use of the machinery and fixtures thereof, and of all the approaches thereto, under and upon such terms and conditions as shall be prescribed by the Secretary of War, upon hearing the allegations and proofs of the parties, in case they shall not agree.

*Provisos.*
**Elevation, spans, etc.**

**Draw.**

**—opening of.**

**Lights.**

**Maintenance of channel within the draw spans.**

**Rights of railroads to use.**

SEC. 3. That the Secretary of War is hereby authorized

Notice of approval of plans. and directed, upon receiving such plan and map and other information, and upon being satisfied that the bridge built upon such plan, with such accessory works, and at such locality, will conform to the prescribed conditions of this Act, to notify the company that he approves the same; and upon receiving such notification the said company may proceed to an erection of said bridge, conforming Changes. strictly to the approved plan and location; and should any change be made in the plan of the bridge or accessory works during the progress of the work thereon, such change shall be subject likewise to the approval of the Secretary of War; and if any bridge erected under said authority shall, in the opinion of the Secretary of War, obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will effectually obviate such obstruction, and all such alterations shall be made and all such obstructions be removed at the expense Litigation of the said corporation; and in case of any litigation arising from any obstruction, or alleged obstruction, to the free navigation of said river, caused, or alleged to be caused, by said bridge, the case may be brought in any court of the United States of the State of North Dakota *Provisos.* Existing law unaffected. in which any portion of said bridge may be located: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers, or to exempt this bridge from the operation of the Removal of piling, etc. same: *Provided further*, That this bridge shall not be opened to traffic until all piling and other false work used in constructing the bridge shall have been wholly removed to the satisfaction of the Secretary of War.

Lawful structure and post route. SEC. 4. That the said bridge and accessory works, when built and constructed under this Act, and according to the terms and limitations thereof, shall be lawful structures, and said bridge shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for the transportation over the railroads or public highways leading to such bridge, and said bridge shall enjoy the rights and privileges of other post routes Freight, etc., charges. of the United States; and Congress reserves the right at any time to regulate by appropriate legislation the charges for freight and passengers over said bridge.

Government telegraph lines. SEC. 5. That the United States shall have the right of way for such postal telegraph lines across said bridge as the Government may construct or control.

Commencement and completion. SEC. 6. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date of approval thereof.

Amendment. SEC. 7. That Congress reserves the right to alter, amend, or repeal this Act at any time.

Approved, February 1, 1901.

February 2, 1901.

**CHAP. 192.—An Act To increase the efficiency of the permanent military establishment of the United States.**

Army.
Reorganization of.
R. S., sec. 1094, p. 202, amended.
Composition.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That from and after the approval of this Act the Army of the United States, including the existing organizations, shall consist of fifteen regiments of cavalry, a corps of artillery, thirty regiments of infantry, one Lieutenant-General, six major-generals, fifteen brigadier-generals, an Adjutant-General's Department, an Inspector-General's Department, a Judge-Advocate-General's Department, a Quartermaster's Department, a Subsistence Department, a Medical Department, a Pay Department, a Corps of Engineers, an Ordnance Department, a Signal Corps, the officers of the Record and Pension Office, the chaplains, the officers and enlisted men of the Army on the retired list, the professors, corps of cadets, the army detachments and band at the United States Military Academy, Indian scouts as now authorized by law, and such other officers and enlisted men as may hereinafter be provided for.

* * * * *

Corps of Engineers.
Composition.
R. S., sec. 1151, p. 208, amended.
Vol. 30, pp. 652, 979.

SEC. 11. That the enlisted force of the Corps of Engineers shall consist of one band and three battalions of engineers. The engineers band shall be organized as now provided by law for bands of infantry regiments. Each battalion of engineers shall consist of one sergeant-major, one quartermaster-sergeant, and four companies. Each company of engineers shall consist of one first sergeant, one quartermaster-sergeant, with the rank, pay, and allowances of sergeant, eight sergeants, ten corporals, two musicians, two cooks, thirty-eight first-class and thirty-eight second-class privates: *Provided*, That the President may, in his discretion, increase the number of sergeants in any company of engineers to twelve, the number of corporals to eighteen, the number of first-class privates to sixty-four, and the number of second-class privates to sixty-four, but the total number of enlisted men authorized for the whole Army shall not, at any time, be exceeded: *And provided*, That officers detailed from the Corps of Engineers to serve as battalion adjutants and battalion quartermasters and commissaries shall, while so serving, receive the pay and allowances herein authorized for battalion staff officers of infantry regiments.

*Proviso.*
Limit enlisted men.

Pay battalion adjutants, etc.

* * * * *

Corps of Engineers.
Organization, etc.

SEC. 22. That the Corps of Engineers shall consist of one Chief of Engineers with the rank of brigadier-general, seven colonels, fourteen lieutenant-colonels, twenty-eight majors, forty captains, forty first lieutenants, and thirty second lieutenants. The enlisted force provided in section eleven of this Act and the officers serving therewith shall constitute a part of the line of the Army: *Provided*, That the Chief of Engineers shall be selected as now provided by law, and hereafter vacancies in the Corps of Engineers in all other grades above that of second lieutenant shall be filled, as far as possible, by promotion ac-

*Proviso.*
Appointment of Chief.

Vacancies, how filled.

—by transfer.

cording to seniority from the Corps of Engineers: *And provided also*, That vacancies remaining in the grades of first and second lieutenant may be filled by transfer of officers of the Regular Army, subject to such professional examination as may be approved by the Secretary of War. Vacancies in the grade of second lieutenant not filled by transfer shall be left for future promotions from the corps of cadets at the United States Military Academy.

* * * * *

Excessive enlistment to supply trained recruits to outside regiments authorized.

SEC. 29. That to fill vacancies occurring from time to time in the several organizations serving without the limits of the United States with trained men, the President is authorized to enlist recruits in numbers equal to four per centum in excess of the total strength authorized for such organizations.

Limit of time for maximum strength.

SEC. 30. That the President is authorized to maintain the enlisted force of the several organizations of the Army at their maximum strength as fixed by this Act during the present exigencies of the service, or until such time as Congress may hereafter otherwise direct: *Provided*, That in the event of the enlistment of a soldier in the Army for the period required by law, and after the expiration of one year of service, should either of his parents die, leaving the other solely dependent upon the soldier for support, such soldier may, upon his own application, be honorably discharged from the service of the United States upon due proof being made of such condition to the Secretary of War.

*Proviso.*
Honorable discharge on account of dependent parent.

Detail of enlisted men for recruiting.

SEC. 31. That the Secretary of War is authorized to detach from the Army at large such number of enlisted men as may be necessary to perform duty at the various recruiting stations, and while performing such duty one member of each party shall have the rank, pay, and allowances of sergeant, and one the rank, pay, and allowances of corporal of the arm of the service to which they respectively belong.

Provisional promotion of officer pending examination.

SEC. 32. That when the exigencies of the service of any officer who would be entitled to promotion upon examination require him to remain absent from any place where an examining board could be convened, the President is hereby authorized to promote such officer, subject to examination, and the examination shall take place as soon thereafter as practicable. If upon examination the officer be found disqualified for promotion, he shall, upon the approval of the proceedings by the Secretary of War, be treated in the same manner as if he had been examined prior to promotion.

* * * * *

Officers honorably discharged may wear uniform of highest commission held, etc.

SEC. 34. That all officers who have served during the war with Spain, or since, as officers of the Regular or Volunteer Army of the United States, and have been honorably discharged from the service by resignation or otherwise, shall be entitled to bear the official title and, upon occasions of ceremony, to wear the uniform of the highest grade they have held by brevet or other commission in the regular or volunteer service.

* * * * *

**Sale of intoxicants in post exchanges, etc., prohibited.**

SEC. 38. The sale of or dealing in, beer, wine or any intoxicating liquors by any person in any post exchange or canteen or army transport or upon any premises used for military purposes by the United States, is hereby prohibited. The Secretary of War is hereby directed to carry the provisions of this section into full force and effect.

**Existing Regular Army commissions unimpaired.**

SEC. 39. That nothing in this Act shall be held or construed so as to discharge any officer from the Regular Army or to deprive him of the commission which he now holds therein.

* * * * *

**Badges, service Spanish war, etc., may be worn, etc.**

SEC. 41. That the distinctive badges adopted by military societies of men "who served in the armies and navies of the United States during the Spanish-American war and the incident insurrection in the Philippines" may be worn upon all occasions of ceremony by officers and men of the Army and Navy of the United States who are members of said organizations in their own right.

**Repeal.**

SEC. 42. That all laws and parts of laws inconsistent with the provisions of this Act be, and the same are hereby, repealed.

Approved, February 2, 1901.

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**February 5, 1901.**

**CHAP. 200.—An Act Extending the time for the commencement and completion of the bridge across the Missouri River at or near Oacoma, South Dakota.**

**Time extended to Chicago, Sioux Falls and Pacific Railway to bridge Missouri River at Oacoma, S. Dak.**
**Vol. 30, p. 805.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the time for the commencement of the bridge across the Missouri River at or near the village of Oacoma, in the State of South Dakota, authorized by the Act of Congress entitled "An Act to authorize the construction of a bridge at or near Oacoma, South Dakota," approved January twenty-eighth, eighteen hundred and ninety-nine, be, and the same is hereby, extended to January twenty-eighth, nineteen hundred and two, and the time for the completion of said bridge be, and the same is hereby, extended to January twenty-eighth, nineteen hundred and four.

Approved, February 5, 1901.

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**February 8, 1901.**

**CHAP. 342.—An Act For the payment of travel allowances, on discharge from the Volunteer Army, to certain officers and enlisted men who reentered the military service of the United States in the Philippine Islands.**

**Army.**
**Travel allowance on reenlistment in Thirty-sixth or Thirty-seventh Volunteer Infantry, or Eleventh Cavalry.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That any officer of Volunteers, and any enlisted man of either Regulars or Volunteers, who was discharged in the Philippine Islands and there reentered the service, through commission or enlistment, in the Thirty-sixth or Thirty-seventh Regiments United States Volunteer Infantry, or in the Eleventh Regiment United States Volunteer Cavalry, shall, when discharged, except by way of pun-

*Provisos.*
Allowance for sea travel.

No travel allowance back to Philippines on muster out in United States.

ishment for an offense, receive for travel allowances, from the place of his discharge to the place in the United States of his last preceding appointment or enlistment, four cents per mile: *Provided*, That for sea travel, on discharge, from or between our island possessions actual expenses only shall be paid to officers, and transportation and subsistence only shall be furnished enlisted men: *Provided further*, That officers and enlisted men discharged in the United States under the provisions of this Act shall not be entitled to transportation or travel allowance back to the Philippine Islands.

Approved, February 8, 1901.

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February 8, 1901.

**CHAP. 343.—An Act To supplement and amend the Act entitled "An Act to incorporate the North River Bridge Company and to authorize the construction of a bridge and approaches at New York City across the Hudson River, to regulate commerce in and over such bridge between the States of New York and New Jersey, and to establish such bridge a military and post road," approved July eleventh, eighteen hundred and ninety.**

North River Bridge Company's bridge across Hudson River at New York.
Time extended for completion.
Vol. 26, p. 268.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That section two of the Act entitled "An Act to incorporate the North River Bridge Company and to authorize the construction of a bridge and approaches at New York City across the Hudson River, to regulate commerce in and over such bridge between the States of New York and New Jersey, and to establish such bridge a military and post road," be, and the same is hereby, so supplemented and amended as to extend the time for the completion of the construction of the bridge by the said Act authorized until the first day of January, in the year of our Lord nineteen hundred and twelve.

Approved, February 8, 1901.

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February 8, 1901.

**CHAP. 344.—An Act Permitting the building of two dams across the Savannah River above the city of Augusta in the State of Georgia.**

Twin City Power Company may dam Savannah River at Dortons Creek, S. C.

—also at Prices Island, etc.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the consent of Congress is hereby granted to Twin City Power Company, a corporation organized under the laws of the State of South Carolina, its successors or assigns, to construct, erect, and maintain a dam across the Savannah River at or near where Dortons Creek, in the county of Edgefield, State of South Carolina, empties into the Savannah River, and all works incident thereto in the utilization of the power thereby developed; and also a dam across the said river at or near the southern end of Prices Island in said river, and about five miles from the mouth of Dortons Creek, and all works incident thereto in the utilization of the power thereby developed: *Provided*, That each of the dams constructed shall be provided with an accessible lock of such capacity as may be prescribed by the Secretary of War: *Provided also*, That the plans for the construction and maintenance of said dams and appurtenant works shall be submitted to and approved by the Chief of Engineers and the Secretary of War before the commencement of the construction of such dam or dams, and that the said Twin City Power Company shall not deviate from such plans after such approval, either before or after completion of the same, unless the modification of said plans shall have previously been submitted to and received the approval of the Chief of Engineers and of the Secretary of War: *Provided further*, That in case any litigation arises from the building of said dam or dams, the maintaining of the same, or from the obstruction of said river by the said dam or dams or appurtenant works, cases may be tried in the proper courts as now provided for that purpose in the States of South Carolina and Georgia, and the courts of the United States.

*Provisos.*
Locks.
Secretary of War to approve plans, etc.
Litigation.

SEC. 2. That the right to amend or repeal this Act is hereby expressly reserved: *And provided further*, That suitable fishways shall be constructed and maintained at said dams by said company, its successors and assigns, as may be required from time to time by the United States Fish Commissioner.

Amendment.
*Proviso.*
Fishways.

SEC. 3. That this Act shall be null and void unless one of the said dams herein authorized shall be completed within five years from the passage of this Act, and unless both dams shall be completed within the same time the rights and privileges hereby granted shall cease and be determined so far as pertains to the incompleted dam: *And provided further*, That such dam or dams shall be constructed in such manner as not to injure or diminish the water power of any person or company having a dam or hydraulic works already constructed: *And provided further*, That before the construction of either of said dams compensation shall be made to any person or company whose lands may be taken or overflowed in the construction or maintenance of such dam or dams, in accordance with the laws of the State where said lands may be situate.

Completion.
*Provisos.*
No injury to existing hydraulic works.
Damages.

Approved, February 8, 1901.

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**CHAP. 345.**—An Act To authorize the construction and to maintain a dam and wagon bridge across Twelve-Mile Bayou, in the parish of Caddo, in the State of Louisiana.

February 8, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Shreveport Water Works Company, of the city of Shreveport, Louisiana, is hereby authorized to construct and maintain a dam and wagon bridge across Twelve-Mile Bayou, in the parish of Caddo, in said State,

Shreveport Water Works Company may dam, etc., Twelve-Mile Bayou, La.

*Proviso.* Secretary of War to approve plans.

and to connect said Twelve-Mile Bayou with Cross Bayou by means of a canal: *Provided*, That the plans and location of such structures shall be submitted to the Secretary of War for his approval, and until the said plans and location are approved by him the work herein authorized shall not be commenced or built.

Amendment. Completion.

Congress reserves the right to alter, amend, or repeal this Act, and that the said dam and wagon bridge shall be completed within three years after the passage of this Act.

Approved, February 8, 1901.

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February 8, 1901.

**CHAP. 346.—An Act Granting to Keokuk and Hamilton Water Power Company right to construct and maintain wing dam, canal, and power station in the Mississippi River in Hancock County, Illinois.**

Keokuk and Hamilton Water Power Company may dam, etc., Mississippi River in Hancock County, Ill.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the assent of Congress is hereby given to the Keokuk and Hamilton Water Power Company, a corporation created and organized under the laws of the State of Illinois, its successors and assigns, to erect, construct, operate, and maintain a canal along the east bank of the Mississippi River, between Nauvoo and Hamilton, in Hancock County, in the State of Illinois, to erect, construct, operate, and maintain a power station thereon, and to project, erect, construct, operate, and maintain a wing dam five hundred feet into the river from the head of the said canal, and to make such other dams and improvements as may be necessary within said limits for the development of water power and the generation, use, and transmission therefrom of electric energy and power at, in, and upon the Des Moines Rapids of the Mississippi River: *Provided*, That the construction hereby authorized do not in any way interfere with the existing low-water channel over the Des Moines Rapids or with the interests of navigation: *And provided further*, That until the plans and location of the works herein authorized, so far as they affect the interests of navigation, have been approved by the Secretary of War the canal or other improvements shall not be commenced or built.

*Provisos.* Existing low-water channel Des Moines Rapids, etc.

Approval of plans.

Commencement and completion.

SEC. 2. That this Act shall be null and void if actual construction of the works herein authorized be not commenced within three years and completed within six years from the date hereof.

Amendment.

SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 8, 1901.

**CHAP. 347.—An Act To authorize the Kingston Bridge and Terminal Railway Company to construct a bridge across the Clinch River at Kingston, Tennessee.**

**February 8, 1901.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Kingston Bridge and Terminal Railway Company, in the State of Tennessee, in its corporate capacity, is hereby authorized and empowered to construct and maintain a bridge over and across the Clinch River, at a point suitable to the interests of navigation, at or near the town of Kingston, so as to connect said town of Kingston with the opposite or north bank of said river.

**Kingston Bridge and Terminal Railway may bridge Clinch River at Kingston, Tenn.**

SEC. 2. That said bridge shall be so constructed that a reasonably free and unobstructed passageway may be secured to all water craft navigating said river at the point aforesaid; and if said bridge shall be constructed as a drawbridge, the draw shall be opened promptly, upon reasonable signal, for the passage of boats and vessels; and whatever kind of bridge is constructed, the owners thereof shall maintain, at their own expense, from sunset to sunrise, such lights or other signals thereon as the Light-House Board shall prescribe.

**Unobstructed navigation.**

**Draw.**

**Lights.**

SEC. 3. That said bridge shall not be built or commenced until the plans and location of the same shall have been approved by the Secretary of War; and no change shall be made in its construction, and no alteration of it shall be made after its construction, unless such change or alteration shall, in like manner, receive the approval of the Secretary of War. And any changes in said bridge which the Secretary of War may at any time order in the interest of navigation shall be promptly made by the said company at its own expense.

**Approval of plans, etc.**

SEC. 4. That the Secretary of War, upon receiving the design, drawings, and specifications of said bridge, and a map of the location, and such other information as he may call for, and upon being satisfied that the bridge when built according to such designs and drawings will be in accordance with the requirements of this Act and will not unreasonably obstruct the navigation of said river, be, and is hereby, authorized and directed to approve said design, drawings, and specifications, and to so notify said Kingston Bridge and Terminal Railway Company; and upon receiving such notification the said Kingston Bridge and Terminal Railway Company may proceed to construct said bridge, conforming strictly to the approved design, drawings, and specifications.

**—notification, etc.**

SEC. 5. That any bridge built under this Act and according to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which the mails, troops, and munitions of war of the United States shall be transmitted free of charge, and the United States shall have the right of way for a postal telegraph across said bridge: *Provided,* That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of rail-

**Lawful structure and post route.**

**Postal telegraph.**

***Proviso.***

**Rights of railroads to use.**

way trains or cars over the same, and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case of any disagreement between the parties in regard to the terms of such use or the sums to be paid, all matters at issue shall be determined by the Secretary of War upon hearing the allegations and proofs submitted to him.

Amendment.

SEC. 6. That the right is hereby expressly reserved to alter, amend, or repeal this Act.

Commencement and completion.

SEC. 7. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date hereof.

Approved, February 8, 1901.

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February 12, 1901.

**CHAP. 353.—An Act To provide for eliminating certain grade crossings on the line of the Baltimore and Potomac Railroad Company, in the city of Washington, District of Columbia, and requiring said company to depress and elevate its tracks, and to enable it to relocate parts of its railroad therein, and for other purposes.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

District of Columbia.
Baltimore and Potomac Railroad.
Elimination of grade crossing, etc., directed.

That the Baltimore and Potomac Railroad Company be, and it is hereby, empowered, authorized, and required to revise, change, and improve the alignment and grade of its railroad, and to relocate parts thereof within the city of Washington, in the District of Columbia, as hereinafter provided, to wit:

Relocation of tracks, etc.

Beginning at a point in its present tunnel under Virginia avenue near the intersection of Eleventh street southeast, and extending thence by a continuation of said tunnel, with a width sufficient for not less than two nor more than four tracks, along and under Virginia avenue to the west side of Second street southeast; thence in the open, with a width sufficient for four main tracks, along what would be Virginia avenue if extended through reservation seventeen, now called Garfield Park, to another section of Virginia avenue as now opened at South Capitol street; thence along said last-mentioned section of Virginia avenue to a connection with its present four main tracks and right of way near Delaware avenue; thence continuing said four tracks along and on said Virginia avenue and Maryland avenue to the Potomac River; and also from points on said last-described line, that is to say, from east of Sixth street southwest; thence by a curved line with three tracks crossing over Sixth street southwest, Maryland avenue, and B street southwest, to and upon that portion of the Mall hereinafter described; and from a point west of Seventh street southwest by a curved line, with three tracks over Seventh street southwest, Maryland avenue, and B street southwest, to and upon said portion of said Mall, with such grade, and at such elevations, with reference to the streets of said city, and on such locations as are shown on plans and profiles prepared by said railroad company, and approved by the Commissioners of the District of Columbia, and as hereinafter specified; it being the purpose of this Act that the said railroad shall be located under Sixth street southeast, Fifth street southeast, Fourth street southeast, Third street southeast, and Second street southeast, in a tunnel as aforesaid; that New Jersey avenue shall be carried over said railroad on an iron or steel bridge; and that said railroad shall be carried over South Capitol street, Delaware avenue, First street southwest, Second street southwest, Third street southwest, Four-and-a-half street southwest, Sixth street southwest, Seventh street southwest, Maryland avenue, and B street southwest, and that Ninth street southwest, Tenth street southwest, Eleventh street southwest, and Twelfth street southwest shall be carried over said railroad on iron or steel bridges. The railroad shall also be carried over Water street southwest.

### REMOVAL OF TRACKS FROM SIXTH, K, AND CANAL STREETS.

**Removal of tracks from Sixth, K, and Canal streets.**

SEC. 2. That the said Baltimore and Potomac Railroad Company be, and it is hereby, required to remove its present eastern connection between its passenger station and its line on Virginia avenue via Sixth street, including all tracks on Sixth street, and its western connection via Maryland avenue, and to change and relocate its tracks connecting with the new terminus contemplated by this Act, in the manner authorized and provided by the preceding section hereof, and as shown on the plans and profiles in said section referred to, and also shall remove its tracks from K street and Canal street, east of New Jersey avenue southeast; and said tracks which are to be abandoned shall be removed within sixty days after the new track is ready for use, and the roadway of said Sixth street between B street south and B street north shall be provided with a modern pavement at the expense of said railroad company, to the satisfaction of the Commissioners of the District of Columbia.

### STATION BUILDING.

**Station building.**

**—location.**

SEC. 3. That in order to accommodate the increasing passenger, mail, express, and other traffic in the city of Washington the said Baltimore and Potomac Railroad Company shall have and be possessed of the right, which is hereby granted and conferred, to occupy and use, on the conditions hereinafter mentioned, that portion of the Mall lying between B street southwest and B street northwest as the southerly line of said B street northwest is hereinafter defined, and between the west line of Sixth street and a line drawn parallel therewith and three hundred and forty feet west thereof, and to erect and maintain thereon a station building and appurtenances, train sheds, and tracks and sidings in connection therewith suitable and adequate for the convenient accommodation of said traffic; and the said Baltimore and Potomac Railroad Company shall, in connection with its occupation and use of the portion of the Mall hereby granted, locate, construct, and maintain beneath its tracks and structures on the line of West Capitol street, as shown on the city maps, a substantial arch or arches not less than two hundred feet in width, as a public passageway for vehicular and pedestrian traffic (as shall be approved by the Commissioners of the District of Columbia), which shall be so constructed as to afford roadways and sidewalks; and the said company shall also pave the said passageways at the time of their construction to the satisfaction of the Commissioners of the District of Columbia, but thereafter the maintenance of the pavement and roadways shall devolve upon the said District of Columbia. The station building to be erected on the Mall shall cost not less than one million five hundred thousand dollars, inclusive of the car sheds, which shall be of ornamental or monumental character, and shall be designed, so far as practicable, so as not to impair the appearance of the Mall; the plans thereof to be approved by the Secretary of War: *Provided*, That upon the lands of the Mall hereby granted to the use of the Baltimore and Potomac Railroad Company no freight depot, warehouse, or other structure, except such as is necessary to its use as the site of a passenger station, shall be erected; and that no tracks, except such as are necessary to the service of such passenger station, shall be laid or operated on said land.

Arch passageway, West Capitol street.

Cost, etc., of station building.

*Proviso.*

No freight depot, etc., on Mall.

## TEMPORARY TRACKS.

Authority to lay temporary tracks.

SEC. 4. That if it should at any time be deemed necessary or advisable, in the construction of the works herein authorized, to lay temporary tracks on any street or avenue to accommodate the business of the Baltimore and Potomac Railroad Company pending the completion of such works, the said company may lay such temporary tracks, subject to the approval and under the direction of the Commissioners of the District of Columbia, and shall remove the same and restore every such street or avenue to its former condition, to the satisfaction of said Commissioners, within sixty days after the time fixed for the completion of the works herein authorized.

## REMOVAL OF FISH COMMISSION BUILDING.

Fish Commission building.

—removal of.
—rebuilding.

—expense of; limit.

SEC. 5. That the United States Fish Commission building and appurtenances, now located on that part of the Mall hereby granted to said Baltimore and Potomac Railroad Company, shall be removed therefrom and rebuilt on the said Mall west of the portion thereof so granted to said railroad company, under the directions of, and according to plans approved by, the Chief of Engineers of the United States Army; and the cost of such removal and rebuilding shall be defrayed by the said Baltimore and Potomac Railroad Company to an amount not exceeding forty thousand dollars: *Provided*, That the expense of such removal and rebuilding in excess of forty thousand dollars shall be paid by the United States.

*Proviso.*—United States liable for excess.

### RETAINING WALLS.

Retaining walls for embankments, etc.

SEC. 6. That in elevating or depressing its tracks, as hereinbefore authorized, the said railroad company is hereby required to support the sides of all embankments and excavations made in the streets wherein the same are located with suitable retaining walls of stone. These walls, in cases of excavation, shall be carried to a height of four feet above the revised grades of said streets, or shall be provided with suitable iron railings. The space to be occupied and used by the said railroad company where its tracks are depressed on Maryland avenue shall not exceed fifty-eight feet between the inside faces of the parallel retaining walls, measured at the level of the said tracks, as shown on said plans and profiles.

Space occupied on Maryland avenue.

### STREETS TO BE VACATED.

Streets to be vacated.

SEC. 7. That to enable said Baltimore and Potomac Railroad Company to effect the revision, change, and improvement in the alignment and grade of its railroad, and the relocation of parts thereof as authorized and contemplated by this Act, the following-named streets and crossings in said city of Washington shall be, upon the completion of the work herein authorized, completely vacated and abandoned for public use, namely:

Canal street, as located and shown on the city maps, between South Capitol street and New Jersey avenue.

G street southeast and H street southeast, between South Capitol street and New Jersey avenue.

I street southeast, between First and South Capitol streets.

Virginia avenue, on the south side of the said railroad, between Second street and Four-and-a-half street southwest, and on the north side of the said railroad between Four-and-a-half street and Seventh street southwest.

Maryland avenue, on the south side of said railroad, between Ninth and Tenth streets southwest.

Maryland avenue, between Twelfth and Fourteenth streets southwest; and in consideration of, and in connection with, the vacation of said portion of Maryland avenue between Twelfth and Fourteenth streets southwest, the said railroad company shall acquire and dedicate to the District of Columbia the necessary property to increase the present width of D street southwest, between Twelfth and Fourteenth streets southwest, thirty feet on the south side thereof.

Thirteenth and Thirteen-and-a-half streets, between D and Water streets southwest, and

E street southwest, between Twelfth street southwest and Water street.

The following-named streets are hereby vacated and abandoned, namely:

F street southwest and E street southwest, where they cross the said railroad;

D street southwest, between Four-and-a-half and Sixth streets southwest;

*Provisos.*
Repair of sewers, etc., in vacated streets permitted.

C street southwest, between Sixth and Seventh streets southwest: *Provided, however,* That nothing herein contained shall be construed to prohibit the public authorities from entering upon vacated and abandoned streets and avenues for the purpose of locating, constructing, maintaining, or repairing therein sewers, water mains, gas mains, conduits, or other underground construction necessary for the public comfort, convenience, or health: *And provided further,* That no portion of any street shall be closed under authority of this Act until said railroad company shall have secured control of the property abutting upon said portion to be closed, it being the intent hereof that no property owner shall be deprived of egress from or ingress to his property.

### CHANGES IN GRADE; WIDENING B STREET.

Commissioners may change grades.

Widening B street.

The Commissioners of the District of Columbia are hereby authorized and directed to make all such changes in the lines and grades of any street or streets in said city as may be reasonably required or deemed necessary or advisable in connection with the revision, change, improvement, and partial relocation of said railroad by this Act contemplated, and particularly are authorized and directed to widen B street northwest, on its southerly side, between Sixth and Seventh streets, so as to conform to the southerly line of said street as it now exists west of Seventh street, and to widen Seventh street on its easterly side between B street northwest and the northerly line of West Capitol street, as shown on the city maps, as follows: For a distance of one hundred and thirty feet south from the southerly line of said B street northwest, when widened as herein authorized, to a width of two hundred and twenty feet, and for the residue of the distance to the northerly line of West Capitol street to a width not exceeding one hundred and thirty feet.

### GARFIELD PARK.

Use of part of Garfield Park authorized.

SEC. 8. That in consideration of and in connection with the changes and improvements to be made in the said railroad by the Baltimore and Potomac Railroad Company, in conformity with the requirements of this Act, the said railroad company shall have and be possessed of the right and privilege, which are hereby expressly granted and conferred, to occupy and use, for tracks and other corporate purposes, all that portion of reservation seventeen, now known as Garfield Park, which lies to the southward of its main tracks when located as authorized by this Act, as well as that portion thereof which shall be occupied by said main tracks as located on said plans and profiles; and also the like right and privilege to occupy and use, for similar purposes, the parts or portions of the several streets and crossings which are by this Act vacated and abandoned.

### DIVISION OF COSTS.

**Division of cost of improvements.**

SEC. 9. That the entire cost and expenses of the revision, changes, relocations, and improvements of and in said railroad, as authorized and required by the preceding sections of this Act, and of all structures connected therewith or incidental thereto, shall be borne, paid, and defrayed in manner following, to wit: The said Baltimore and Potomac Railroad Company shall bear, pay, and defray all cost and expense of the relocations, elevation, and depression of its tracks within the limits of its right of way as are authorized and required by this Act, including the construction of so much of the bridges conveying streets over its tracks, right of way, and other property as shall be within the limits thereof, and the reconstruction within such limits of the streets which shall be carried beneath the same, the cost and expense of removing its tracks from Sixth street north of Virginia avenue, and from K street and Canal street, and the restoration of such parts of said streets for the uses of the public, and the cost and expense of constructing and maintaining the arch or arches for passageways underneath its said tracks located on the Mall, as well as the original cost of paving the roadways and sidewalks to be located within the said passageways. All other costs, expenses, and damages resulting from, incidental to, or connected with the revisions, changes, and improvements in alignment and grades of said railroad, or the relocations thereof by this Act required and authorized, and from changes in the grades of the streets or the railroad, and the lawful operation of the said railroad upon the location and structures contemplated and required by this Act, and whether to property owners affected thereby or otherwise, as well as the cost and expense of all street approaches to said company's tracks and right of way, whether overhead by means of bridges or under grade, shall be borne, paid, and defrayed in manner following, to wit: Fifty per centum thereof by the United States and the remaining fifty per centum thereof by the District of Columbia, which last-mentioned fifty per centum shall be levied and assessed upon the taxable property and privileges in said District other than the property of the United States and of the District of Columbia.

**Approval of work, etc.**

All work within the limits of the said railroad company's right of way, including the bridges within said limits, shall be done by said railroad company to the satisfaction and approval of the Commissioners of the District of Columbia, who are authorised to exercize such supervision over the same as may be necessary to secure the proper construction and maintenance of the said work. And all work which is without the limits of the right of way of said railroad company shall be done by the District of Columbia.

### PROPERTY TO BE ACQUIRED BY PURCHASE OR CONDEMNATION.

Property to be acquired by purchase or condemnation.

*Provisos.*
Land acquired south of present yards, etc.

Expenses, etc.

SEC. 10. That to enable the Baltimore and Potomac Railroad Company to effectuate the purposes contemplated and authorized by this Act, the said company be, and they are hereby, authorized and empowered to acquire, either by purchase or condemnation, as hereinafter provided, and, when so acquired, to use the same for tracks and other corporate purposes, and make all such improvements thereon and thereto as may be deemed necessary, the following properties, to wit: All of squares four hundred and sixty-two, four hundred and sixty-three, four hundred and sixty-three south, and four hundred and ninety-three; and also as much land as may be required for tracks and other corporate purposes which lies to the south of the present main tracks of the company between South Capitol and First streets southeast and north of the northerly line of M street: *Provided, however*, That if land shall be acquired south of the present railroad yards and between South Capitol and First streets southeast as in this section authorized the said railroad company shall, when so required by the Commissioners of the District of Columbia, make adequate and suitable provision for carrying such streets as may intersect the same across the tracks which shall be located thereon by overhead bridges in a manner satisfactory to the said Commissioners: *Provided further*, That the cost and expense of raising grades of streets and all approaches to such bridges shall be borne and defrayed by the District of Columbia and the United States, as hereinbefore provided.

Acquiring land by appraisal.

R. S. D. C., secs. 648 to 663, pp. 78, 79.

*Provisos.*
—right of entry on deposit of award.

Sidings for manufactories, etc., authorized.

In case the said Baltimore and Potomac Railroad Company can not, for any reason, agree with the owner or owners for the purchase, use, or occupation of any of the land it is authorized to acquire by purchase or condemnation, then the same may be acquired by the said company in the same manner and by the same procedure as are provided by sections six hundred and forty-eight to six hundred and sixty-three, both inclusive, of the Revised Statutes, relating to the District of Columbia: *Provided*, That in every case in which an assessment of the damages or an award shall have been returned by the appraisers the company, upon paying into court the amount so assessed or awarded, may enter upon and take possession of the land and property covered thereby irrespective of whether exceptions to said assessment or award shall be filed or not, and the subsequent proceedings shall not interfere with or affect such possession, but shall only affect the amount of the compensation to be paid. And it shall be lawful for said Baltimore and Potomac Railroad Company to extend and construct, from time to time, branch tracks or sidings from the lines of railroad authorized by this Act into any lot or lots adjacent to any street or avenue along which said lines of railroad are located, upon the application of the owner or owners of such lot or lots, to enable such owners to use their property for the purposes of coal, wood, or lumber yards, manufactories, warehouses, and other business enterprises: *Provided, however*, That no grade crossing of any street or avenue within the city of Washington shall be thereby created, but such connecting tracks shall be carried across such street or avenue in such manner as not to obstruct the free use thereof, and the plans of such connecting tracks shall in every case be first filed with and approved by the Commissioners of the District of Columbia: *Provided further*, That as to square southeast of square two hundred and sixty-seven and square two hundred and seventy the Southern Railway Company (a railroad corporation of the State of Virginia, whose trains now move and are expected to continue to move to and from Washington over the tracks of the said Baltimore and Potomac Railroad Company and Washington Southern Railroad Company under agreements existing or hereafter to be made with the last-named companies granting the necessary right therefor) and its successors shall have the same rights of acquisition by purchase or condemnation, to be exercised under the same conditions, as are in this Act provided for the acquisition of additional land by the Baltimore and Potomac Railroad Company; and such squares when so acquired may be used by said Southern Railway Company and its successors to accommodate the handling and delivery of local freight traffic and for its other corporate purposes in the District of Columbia.

**—no grade crossing to be created, etc.**

**Squares 267, 270, etc.**

### LONG BRIDGE.

SEC. 11. That inasmuch as the present Long Bridge over the Potomac River is inadequate for the accommodation of the largely increased railroad and vehicular traffic, is in a measure obstructive of navigation, and needs to be reconstructed, the Baltimore and Potomac Railroad Company is hereby directed and required to remove the present Long Bridge across the Potomac River, and, in accordance with plans to be approved by the Secretary of War, to build on practically the same line a new bridge in lieu thereof, said new bridge to be for railroad purposes only and to be adapted for two or more railway tracks, the Long Bridge to be removed and the new bridge constructed within four years from the date of the passage of this Act. The said Baltimore and Potomac Railroad Company shall remove the Long Bridge and shall build, maintain, and keep in repair said new bridge at its own cost and expense, and shall maintain an efficient draw in said new bridge, operating the same so as not to unnecessarily impede the free navigation of the Potomac River at any hour of the day or night, and shall give other railroad companies the right to pass over said bridge upon such reasonable terms as

**Long Bridge.**
**Railroad to substitute new railroad bridge for.**

may be agreed upon between the companies or prescribed by Congress.

### PASSENGER BRIDGE.

New passenger bridge authorized

SEC. 12. That the Secretary of War be, and he is hereby authorized to enter into a contract with the Baltimore and Potomac Railroad Company or any other party to construct within two years after the passage of this Act, at a point not less than five hundred feet above the site of the present Long Bridge, a new and substantial bridge for highway travel, of iron or steel, resting upon masonry piers and provided with suitable approaches, and with a sufficient draw, all in accordance with plans and specifications to be approved by the Secretary of War; and there is hereby appropriated (one-half out of the revenues of the District of Columbia and one-half out of any money in the Treasury not otherwise appropriated) the sum of five hundred and sixty-eight thousand dollars, or so much thereof as may be necessary, to be paid from time to time, as the construction of the said bridge progresses, by the Secretary of War, under such regulations as he shall precribe.

Street railroads may cross bridge, etc.

*Provisos.*

Mount Vernon railway may relocate, etc.

—motive power, etc.

Passenger tax.

The said bridge shall be for highway traffic, and all street railroads chartered or that may hereafter be chartered by Congress shall have the right to cross said bridge on such terms as may be prescribed by Congress: *Provided*, That the Washington, Alexandria and Mount Vernon Railway Company now using the Long Bridge shall be permitted, with the approval of the Commissioners of the District of Columbia, to change its location so as to cross the highway bridge herein provided for; all plans for such change to be approved by the Commissioners of the District of Columbia and the Chief of Engineers of the United States Army: *And provided further*, That a standard underground electric system of street car propulsion shall be installed by said company on the park highway leading to said bridge, and no dynamo furnishing power to this portion of the road shall be in any manner connected with the ground, and that the cost of asphalt paving between the tracks and two feet outside thereof shall be paid by said company. Each street railway company using said bridge shall pay in addition to other taxes as by its charter provided, one-half of one cent for each and every passenger carried across said bridge.

### PLANS TO BE SUBMITTED TO DISTRICT COMMISSIONERS.

Commissioners to approve plans.

Completion of work.

SEC. 13. That before any portion of the work herein described shall be authorized plans and profiles of the entire work, except such as relate to the new bridges authorized by sections eleven and twelve, in accordance with the provisions herein contained, shall be prepared by the said Baltimore and Potomac Railroad Company and shall be submitted for approval to the Commissioners of the District of Columbia. Duly authenticated copies of said plans and profiles shall, after approval, be filed with the Commissioners aforesaid, and all work shall be done in accordance with them and shall be completed within five years from the date of the passage of this Act. The company shall also deposit with the collector of taxes of the District of Columbia such sums of money as the Commissioners of said District may reasonably require to cover the cost of District inspection.

Deposit for cost of inspection.

### TAXATION.

Company's property taxable.

SEC. 14. That the property occupied by the Baltimore and Potomac Railroad Company under authority of this Act, together with the improvements which may be put thereon, shall be subject to tax by the District of Columbia the same as other property in the District of Columbia: *Provided*, That no assessment, valuation, or tax shall be made, laid, or levied on the Baltimore and Potomac Railroad Company on account of any bridges, tunnels, elevated tracks, or subway which shall be located, constructed, or maintained under the authority of this Act, and forming part of said railroad, in excess of that which would or could be lawfully made, laid, or levied if said railroad was wholly located and constructed on the surface of the ground; it being the true intent and meaning hereof that any such bridges, tunnels, elevated tracks, or subway forming a part of said railroad shall be assessed and valued for purposes of taxation and taxed on the same basis as any other equal portion of railroad situated within the said District of Columbia not constructed on, in, through, or upon any such bridges, tunnels, elevated tracks, or subway.

*Proviso.*—qualification.

### RIGHTS OF SUCCESSION.

Rights of succession.

SEC. 15. That all the provisions of this Act, including all rights, powers, and privileges granted to, or duties imposed upon, said Baltimore and Potomac Railroad Company, shall accrue to and devolve upon its successors and assigns; and in case the said Baltimore and Potomac Railroad Company, its capital stock, properties, corporate rights, powers, privileges, immunities, and franchises; shall be merged into or consolidated with the Philadelphia, Wilmington and Baltimore Railroad Company, or any other railroad corporation, to which the assent of Congress is hereby given, then and in that event the company which shall, by such merger or consolidation, so acquire the same shall be invested with and possessed of all the rights, powers, property, and privileges of said Baltimore and Potomac Railroad Company within the District of Columbia, as well those granted by this Act as those heretofore existing, and shall have and exercise all the necessary rights, powers, and franchises respecting the same as fully as they would have been possessed and exercisable by said Baltimore and Potomac Railroad Company.

### REPEAL OF CONFLICTING ACTS.

Repeal.

SEC. 16. That all laws or parts of laws inconsistent herewith be, and they are hereby, repealed.

### RESERVED RIGHTS OF CONGRESS.

Amendment.

SEC. 17. That Congress reserves the right to alter, amend, or repeal this Act.

Approved, February 12, 1901.

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February 12, 1901.

**CHAP. 354.**—An Act To provide for eliminating certain grade crossings of railroads in the District of Columbia, to require and authorize the construction of new terminals and tracks for the Baltimore and Ohio Railroad Company in the city of Washington, and for other purposes.

District of Columbia.
Baltimore and Ohio Railroad.
Elimination of grade crossings, construction of new terminals, etc.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Baltimore and Ohio Railroad Company, and the terminal company incorporated as provided in this Act, be, and each of them is hereby, empowered and authorized to locate, construct, maintain, and operate new terminals and new lines of railroad to accommodate the traffic of the said Baltimore and Ohio Railroad Company, in connection with its Washington Branch Railroad and Metropolitan Branch Railroad within the District of Columbia and in the city of Washington, as hereinafter provided. The said new terminals and terminal tracks shall occupy the streets, avenues, public reservations, and property belonging to the United States, and such of the lands and property belonging to others as may be acquired by either of said companies, situate and lying within the area bounded as follows, to wit: Beginning at the intersection of the south line of H street north and a line forty feet from the east building line of Delaware avenue and parallel thereto; thence along said line parallel to the easterly building line of Delaware avenue and forty feet therefrom to the west line of First street east; thence by said west line of First street east to the north line of C street north; thence by said north line of C street north to the east line of North Capitol street; thence north by said east line of North Capitol street to the south line of Massachusetts avenue; thence by a straight line to the intersection of the west line of First street east and the south line of H street north; thence to the point of beginning, or so much of this area as may be found to be necessary for proper terminal facilities and agreed upon between the Baltimore and Ohio Railroad Company and the Commissioners of the District of Columbia: *Provided,* That no portion of any street shall be closed under authority of this Act until said railroad company shall have secured control of the property abutting upon said portion to be closed, it being the intent hereof that no

Location of new terminals and tracks.

*Proviso.*
Access to private property not to be impaired.

property owner shall be deprived of egress from or ingress to his property.

Location of connecting lines between terminals and present lines.

The main lines of railroad connecting said new terminals and terminal tracks with the present lines of railroad of said Washington Branch and said Metropolitan Branch shall be located as follows: From the south side of H street said lines shall run by a masonry viaduct of width sufficient for five tracks, but not exceeding in width eighty feet, with such turn-outs and sidings to adjoining property as may at any time hereafter be constructed under the authority of this Act, northerly along the middle of Delaware avenue to the north line of M street; thence northerly still in Delaware avenue, with five main tracks, but with the right to locate and construct sidings in Delaware avenue to and into adjoining property, including all of square numbered seven hundred and forty-eight, and crossing Florida avenue overhead by means of a two-span plate-girder bridge, or by masonry arches, to the north side of Florida avenue; thence by diverging lines crossing over New York avenue by means of a two-span plate-girder bridge or bridges over the same, or by masonry arches; the one line, with two or more tracks, by the most practicable route in a general northeasterly direction, to a point of connection with the present tracks of the Washington Branch Railroad north of Winthrop Heights Station, and the other line, with two or more tracks, in a northerly direction by the most practicable route, to a point of connection with the present tracks of the said Metropolitan Branch Railroad at or near Rhode Island avenue extended.

Location of roundhouses, etc.

SEC. 2. That said companies be, and each of them is hereby, authorized and empowered to locate, construct, maintain, and operate, outside of the city limits and south of V street, yard tracks, switches, roundhouses, shops, and other structures necessary or proper for the accommodation of locomotives and cars for the conduct of its business or for the purposes of a freight yard; and also to locate, build, maintain, and operate, beyond the city limits, a branch track or "Y" for the passage of trains directly to and fro between the Metropolitan Branch and the Washington Branch without entering the city: *Provided*, That said roundhouses and shops shall be located within said "Y" as far eastwardly as in the judgment of the Commissioners of the District of Columbia it is practicable.

—branch track or "Y".

Streets to be vacated, etc.

SEC. 3. That to accomplish the purposes of this Act the following-named streets in the subdivision of Eckington east of the right of way of the Metropolitan Branch of the Baltimore and Ohio Railroad Company shall be completely vacated and abandoned by the public and closed to public use, namely: Q, R, Third between New York avenue and Florida avenue, Fourth, Fifth, and Randolph streets; S and Seaton streets west of Sixth street; and Sixth street south of U street and Seventh street between New York avenue and Brentwood road shall not be opened. The Brentwood road shall also be closed between S street and Florida avenue. New York avenue and Florida avenue shall be carried under said railroad, as provided in the first section of this Act. T and V streets shall be carried under by a subway, or over the Metropolitan Branch Railroad by a bridge or viaduct. Between the north line of M street and the south line of G street all the tracks hereinbefore authorized shall be elevated and carried on a masonry viaduct, which said viaduct shall be so constructed with arches or bridges as to permit each and every intersecting street or avenue in the city to be passed and continued under the same through arched openings or spaces of sufficient clearance to permit the free and unobstructed use of said streets and avenues, in the form and manner and of the dimensions shown and indicated on the plan and profiles agreed upon between the said Baltimore and Ohio Railroad Company and the Commissioners of the District of Columbia, and now on file in the office of the Engineer Commissioner: *Provided*, That M street may be crossed by a metal bridge instead of a masonry arch, if desired, in order to avoid any change in the grade of said street.

Elevated tracks.

*Proviso.*

Metal bridge on M street.

Vacated streets in city.

The following-named streets within the city limits shall be completely vacated, abandoned, and closed, namely: N street, between Second street east and Third street east, and Delaware avenue shall be closed and abandoned between the south line of Florida avenue and the north line of M street; E street between First street and North Capitol street; D street between First street and North Capitol street, and Delaware avenue between F street and C street, it being the intention of this Act that all streets, avenues, ways, and alleys within the area to be occupied and used for terminals and terminal tracks, as shown on said plan filed in the office of the Engineer Commissioner, shall be completely vacated, abandoned, and closed, and the use thereof and of any public reservation or street spaces of the United States within said area be granted to the said railroad company or terminal company constructing such terminals for the purposes of the same, except that Massachusetts avenue and F street shall be carried under said terminals by means of arches, in accordance with plans approved by the Commissioners of the District of Columbia.

Authority to close streets, etc.

The Commissioners of the District of Columbia are hereby authorized and directed to cause all streets, avenues, ways, and alleys to be closed, as provided in this Act and in accordance with the intent thereof; and also to make such changes in the existing lines and grades of any street, avenue, or way as may be reasonably required, deemed necessary, or advisable in the construction of the works hereby authorized.

That such portions of the structures carrying T and V streets over and under the tracks of the Baltimore and Ohio Railroad Company as lie within the limits of the right of way of said company shall be built and paid for by said company; and that so much of the change of grade at M street and Florida avenue as may be necessary to carry said highways under the line of the railroad within the limits of the right of way of said company shall be paid for by the railroad company. The approaches, however, to said T street, V street, Florida avenue, and M street, and all of the work not within the right of way at said points shall be made and constructed by and under the supervision of the Commissioners of the District of Columbia and paid for from funds available for the purpose.

Location of fire engine house.

SEC. 4. That the Baltimore and Ohio Railroad Company shall, before taking possession of the ground now owned by the United States in square six hundred and eighty-three, secure and convey to the United States a tract of ground containing not less than twenty-one thousand square feet, which location shall be subject to the approval of the Commissioners of the District of Columbia and the Sergeant-at-Arms of the United States Senate, and locate thereon a fire-engine house at a cost of not less than thirty thousand dollars and stables at a cost of not less than fifteen thousand dollars; or, if said company prefers, it may have the said buildings erected by the Commissioners of the District of Columbia by depositing the amounts stated above with the said Commissioners and Sergeant-at-Arms, respectively, and when such buildings have been accepted by the District of Columbia and the Sergeant-at-Arms of the Senate, respectively, or the amounts necessary for their construction deposited as aforesaid, it shall have authority to remove said structures on the ground aforesaid. And the Baltimore and Ohio Railroad Company shall have the right to condemn such land in the city as is hereinbefore required, and for said purposes the provisions of section eleven of this Act are hereby made applicable to the provisions of this section.

Location of additional passenger, etc., stations.

Provisos.
—qualification.

Adjacent land may be acquired.

—extension of tracks on.

SEC. 5. That in addition to the main or terminal station or depot, to be located as hereinbefore provided, the Baltimore and Ohio Railroad Company, or the terminal company incorporated as provided in this Act, may from time to time hereafter construct, establish, and maintain such additional stations or depots, for passengers or freight, as the company may deem necessary or useful in the conduct of its business, or for the accommodation of the freight and passenger traffic passing over the lines of railroad authorized by this Act, at such point or points within said District as the Commissioners of the District of Columbia shall approve: *Provided*, That no such station or depot within the city limits shall be located east of Second street east, and west of North Capitol street, and it shall be lawful for either of said companies to acquire, by gift, purchase, or condemnation, any land adjacent to any street or avenue along or upon which the lines of railroad and works hereby authorized shall be located, and hold and improve the same in such manner as it may deem necessary or beneficial to accommodate or promote the traffic on said railroad, and to extend and construct tracks of railroad into and upon any lands so acquired and connect the same with the tracks on such adjacent street or ave-

—no grade crossing to be created, etc. nue: *Provided, however*, That no grade crossing of any street or avenue within the city of Washington shall be thereby created, but such connecting tracks shall be elevated and carried over the portion of such street or avenue crossed in such manner as not to obstruct the free use thereof, and the plans of such connecting tracks and elevated structure shall in every case be first filed with and approved by the Commissioners of the District of Columbia. Sidings for manufactories, etc. And it shall be lawful for said companies, or either of them, subject to the same conditions and restrictions, to extend and construct, from time to time, branch tracks or sidings from the lines of railroad authorized by this Act into any lot or lots adjacent to any street or avenue along which said lines of railroad are located, upon the application of the owner or owners of such lot or lots, to enable such owners to use their property for the purposes of coal, wood, or lumber yards, manufactories, warehouses, and other business enterprises.

Temporary tracks authorized. SEC. 6. That if it should at any time be deemed necessary or advisable in the construction of the works hereby authorized to lay temporary tracks on any street or avenue to accommodate the business of the Baltimore and Ohio Railroad Company pending the completion of such works, the said company may lay such temporary tracks, subject to the approval and under the direction of the Commissioners of the District of Columbia, and shall remove the same and restore every such street or avenue to its former condition, to the satisfaction of such Commissioners, within sixty days after the time fixed for the completion of the works hereby authorized.

Plans. SEC. 7. That it is the intention of this Act that the location and construction of the new terminals, terminal tracks, viaduct, and railroad lines hereby authorized within the city of Washington shall be substantially in accordance with the plans agreed upon by and between the Commissioners of the District of Columbia and the Baltimore and Ohio Railroad Company, which plans, with the accompanying drawings, maps, and tracings, signed by the Commissioners and by the chief engineer of such railroad company, are filed in the office of the Engineer —changes. Commissioner of said District; but that the company constructing said works shall be authorized to make such minor changes or modifications of or departures from said plans, drawings, maps, and tracings as it may reasonably require or deem necessary, advisable, or advantageous and as the Commissioners shall approve and agree to; —approval. and in case of any change or modification of or departure from the present plans the Baltimore and Ohio Railroad Company shall submit the new plans to the said Commissioners for their approval, and shall file duly authenticated copies of said plans, after approval, with the Commissioners.

Approval of construction. All work of construction authorized by this Act which shall affect in any way the existing streets or avenues of the city or District not hereby abandoned and closed shall be done to the satisfaction and subject to the approval of the Commissioners of the District of Columbia, who are authorized to exercise such supervision over the same as may be necessary to secure the proper construction and maintenance thereof. The company shall also deposit with the collector of taxes of the District of Columbia such sums of money as the Commissioners of said District may reasonably require to cover the cost of District inspection.

Deposit for inspection.

Completion of work.

SEC. 8. That of the works hereby authorized the viaduct and main lines of railroad thereon and extending therefrom to their points of connection with the Washington Branch Railroad and Metropolitan Branch Railroad, respectively, shall be completed, and said new terminals shall be ready for occupancy, within five years from the date of the passage of this Act.

Removal of present tracks.

From and after the expiration of five years from the date of the passage of this Act all rights of the Baltimore and Ohio Railroad Company to maintain and operate the present tracks of its Washington Branch Railroad within the limits of the city of Washington, and the present tracks of its Metropolitan Branch Railroad south of the northern line of New York avenue, also extending from the north line of New York avenue to the north line of Q street, and west of the east line of Third street to said north line of New York avenue, shall cease and determine; and the said railroad company shall thereupon, within such reasonable time as the Commissioners of the District of Columbia shall prescribe, remove all such tracks and structures connected therewith from the streets, avenues, public reservations, or other property of the United States on all the lines to be abandoned as aforesaid. Said Baltimore and Ohio Railroad Company shall also immediately execute, acknowledge, and deliver to the Commissioners of the District of Columbia a deed, in due form of law, granting, conveying, assigning, and transferring to the United States of America all the estates, right, title, and interest that it, the said Baltimore and Ohio Railroad Company, has in, to, or out of the lands included within the limits of the roadway or right of way of the Washington Branch Railroad of said company from the west line of Second street to Winthrop Heights station and of the Metropolitan Branch for the continuation of Third street from Q street south to New York avenue, of an even width as north of Q street, subject, however, as to so much of said lands as lie north of Florida avenue and outside of the limits of the city of Washington, to the continued maintenance and use of the present tracks of said railroad company thereon, for the purpose of reaching its yard and roundhouse at Trinidad, until its new yard in or near Eckington and its roundhouse, authorized by this Act, shall be ready for use, but not exceeding six years from the date of the passage of this Act; said company, however, to have the right to remove its tracks and structures from the lands so granted within sixty days after the expiration of its right to maintain and use its tracks thereon.

Company to deed to United States right of way, etc., of Washington Branch Railroad, etc.

Appropriation for payment to company.

In consideration of the surrender by the Baltimore and Ohio Railroad Company, under the requirements of this Act, of its rights under the several Acts of Congress heretofore passed, and under its several contracts with the municipal authorities of the city of Washington authorized by said Acts of Congress, and in consideration of the large expenditures required for the construction of the new terminals, viaduct, and connecting railroads, as required by this Act, to avoid all grade crossings of streets and avenues within the city of Washington, and, further, in consideration of the grant and conveyance to the United States of the lands included within the limits of the roadway and right of way of the Washington Branch Railroad, which can be used for a street or avenue for the public benefit, the sum of one million five hundred thousand dollars, to be paid to said railroad company toward the cost of the construction of said elevated terminals, viaduct, and structures within the city of Washington, shall be, and is hereby, appropriated, one half to be paid out of any money in the Treasury of the United States not otherwise appropriated, the other half to be paid out of the revenues of the District of Columbia. The sum so appropriated shall be paid upon presentation of a certificate by the Commissioners of the District of Columbia that the said viaduct has been completed as required by this Act.

Payment of half chargeable against the District.

In order to provide for the one half of said amount chargeable to the District of Columbia, the Commissioners thereof shall, on the first day of July following the passage of this Act, and annually thereafter, pay over to the Treasurer of the United States, out of the revenues of the District of Columbia, the sum of one hundred and fifty thousand dollars, to be invested by the said Treasurer in interest-bearing bonds of the United States or the District of Columbia, until the full sum of seven hundred and fifty thousand dollars, as provided herein, shall have been paid.

Property taxable.

SEC. 9. That the property occupied by the Baltimore and Ohio Railroad Company, or by the proposed terminal company, under authority of this Act, together with the improvements which may be put thereon, shall be subject to tax by the District of Columbia the same as other property in the District of Columbia: *Provided*, That no assessment, valuation, or tax shall be made or levied on the railroad or terminals located, constructed, or maintained under the authority of this Act in excess of that which would or could be lawfully made, laid, or levied if said railroad and terminals were so located, constructed, and maintained without the use of bridges, viaducts, retaining walls, and other structures necessary or properly employed to elevate the same as required by this Act, it being the true intent and meaning hereof that the railroad and terminals hereby authorized shall be assessed and valued for purposes of taxation and taxed on the same basis as if the same were not constructed and maintained by means of such bridges, viaducts, retaining walls, and other structures.

*Proviso.*
--basis of taxation.

**Organization of terminal company in District.**

**R.S.D.C., secs. 618-676, pp. 74, etc.**

**Capital stock.**

**Powers of corporation, etc.**

SEC. 10. That if, for the purpose of constructing and owning the terminals, viaduct, railroads, depots, stations, and other works authorized by this Act, or any part thereof, the Baltimore and Ohio Railroad Company shall deem it expedient or advisable that a terminal company in its interest be created and organized in the District of Columbia, the said Baltimore and Ohio Railroad Company, or some person thereto authorized on its behalf by resolution of its president and directors, together with other persons not less than seven in number, of whom a majority shall be residents of the District of Columbia, shall cause a certificate of incorporation to be executed and recorded in accordance with the provisions of the general incorporation Act of Congress for the District of Columbia relating to railroad companies, being sections six hundred and eighteen to six hundred and seventy-six, both inclusive, of the Revised Statutes relating to the District of Columbia, with such capital stock, not to exceed five million dollars fully paid up, and under such corporate name as may be set forth in such certificate. The corporation so formed shall be vested with all the authority, rights, and privileges granted by said general Act, but the Baltimore and Ohio Railroad Company, or such persons as it may designate by resolution of its president and directors, shall be entitled to subscribe for and hold all the stock of said corporation, without advertisement or allotment, as provided in said sections six hundred and twenty-one and six hundred and twenty-two of said Revised Statutes. Said corporation shall also be vested with and enjoy all the authorities, rights, and privileges herein granted, so far as the same are applicable to or exercisable in its undertaking, as set forth in its said certificate of incorporation, and it shall be bound by all the limitations and provisions of this Act. Said corporation shall have the further powers to contract with the Baltimore and Ohio Railroad Company for the use or operation of its railroad and works by the last-named company, or for the lease of the same, on such terms as may be agreed upon between the two companies, and shall also have the right and power, exercisable at any time, to sell and convey all its railroad, works, and property to the said Baltimore and Ohio Railroad Company in consideration of the latter company assuming all its debts and liabilities and agreeing to repay to every stockholder the amount of money actually paid in on the stock held by him.

On the execution, delivery, and recording of the deed of conveyance, pursuant to and in consummation of such sale, the said terminal company shall ipso facto be dissolved and its corporate existence shall cease.

In the event, however, that the said terminal company shall not be organized under the provisions of this Act then the privileges, powers, and duties herein conferred and imposed shall devolve exclusively upon the Baltimore and Ohio Railroad Company.

**Acquiring land for terminals, etc.**

SEC. 11. That the Baltimore and Ohio Railroad Company and the terminal company incorporated as herein

R. S. D. C., secs. 648-663, pp. 78, 79.

*Proviso.* Right of entry on deposit of appraisers' award.

provided shall be authorized and empowered, from time to time, to take, acquire, and hold, in fee simple, all lands and property required for the terminals, stations, yards, railroad facilities, and other works authorized by this Act, either by purchase or by condemnation, as provided in sections six hundred and forty-eight to six hundred and sixty-three, both inclusive, of the Revised Statutes, relating to the District of Columbia: *Provided*, That in every case in which an assessment of damages or an award shall have been returned by the appraisers, the company upon paying into court the amount so assessed or awarded, may enter upon and take possession of the lands and property covered thereby, irrespective of whether exceptions to said assessment or award shall be filed or not, and the subsequent proceedings shall not interfere with or affect such possession, but shall only affect the amount of the compensation to be paid.

Line outside city limits authorized.

SEC. 12. That the Baltimore and Ohio Railroad Company and the Terminal Company, incorporated as provided in this Act, be, and they are hereby, authorized and empowered to locate, construct, maintain, and operate outside of the limits of the city of Washington a line of railroad with one or more tracks extending from a connection with the Washington Branch Railroad and with the railroad authorized by the foregoing sections of this Act north of Winthrop Heights station by such route as the company may select as most practicable, and be approved by the Commissioners of the District of Columbia, to a connection with the Baltimore and Potomac Railroad and with the said Baltimore and Ohio Railroad Company's Shepherds branch at or near Bennings station; and in the location, construction, maintenance, and operation of the line of railroad authorized by this section the said companies may exercise all the authorities, rights, privileges, and franchises by this Act conferred upon and vested in them in respect of the lines of railroad authorized by the foregoing sections of this Act, outside of the limits of the city of Washington: *Provided*, That whenever in the construction of said line of railroad it shall be found necessary to cross any existing public highway of the District of Columbia the company shall submit to and file with the Commissioners of the District of Columbia proper plans showing the intended crossing, shall obtain the approval of the same by the said Commissioners, and shall construct such crossing only in conformity with such approved plan. Every such highway crossing shall be either over or under grade where practicable without increasing the grades on said railroad or causing unreasonable expense in construction; and for the purpose of avoiding grade crossings the Commissioners of the District of Columbia shall be fully authorized and empowered to change the grade of any such public highway so as to pass the same over or under said railroad, and to deflect or divert any such highway so as to pass over or under said railroad at a different point of crossing, and to close so much of the said highway as is abandoned; and the company shall acquire, by purchase

*Proviso.* —highway crossings: approval of plans.

—relocating highways.

or condemnation, at its own expense, all lands required to relocate such highways, and shall pay the cost of all new construction or work required to restore any such highway raised, depressed, deflected, or relocated as above provided, all of which construction and work shall be done to the satisfaction and subject to the approval of the said Commissioners.

Repeal.

SEC. 13. That all existing laws or parts of laws inconsistent with the provisions of this Act are hereby repealed to the extent to which they are so inconsistent, but to no further or other extent.

Amendment.

SEC. 14. That Congress reserves the right to alter, amend, or repeal this Act.

Approved, February 12, 1901.

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February 12, 1901.

**CHAP. 357.—An Act To authorize the Chattahoochee and Gulf Railroad Company, of Alabama, to construct a bridge across the Choctawhatchee River, a navigable stream in Geneva County, Alabama.**

Chattahoochee and Gulf Railroad may bridge Choctawhatchee River near Geneva, Ala.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Chattahoochee and Gulf Railroad Company, of Alabama, be, and is hereby, authorized to construct and maintain and operate a bridge across the Choctawhatchee River, a navigable stream, in the county of Geneva, State of Alabama; said bridge to be located about eleven miles from the town of Geneva in said county.

Secretary of War to approve plans.

SEC. 2. That said bridge shall be built and located under and subject to such regulations for the security of navigation as the Secretary of War may prescribe; and to secure that object the said The Chattahoochee and Gulf Railroad Company, of Alabama, shall submit for his examination designs and drawings of the bridge, and maps of the location, giving, for the space of one-half mile above and one-half mile below the proposed location, the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the currents, and the soundings, accurately showing the bed of the river, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject, and until the said plans and location are approved by him the bridge shall not be commenced or built; and should any change be made in said bridge, before or after completion, such changes shall be likewise subject to the approval of the Secretary of War.

Aids to navigation.

Lights.

Changes.

SEC. 3. That said bridge shall be kept and managed so as to offer reasonable and proper means for the passage of vessels and craft through or under the same; and for the safety of vessels passing at night there shall be displayed on said bridge at night, from sunset to sunrise, at the expense of the owners thereof, such lights or other signals as the Light-House Board may prescribe. And any changes in said bridge which the Secretary of War may at any time deem necessary, and order in the interests of navigation, shall be made by the owners thereof at their own expense.

Rights of railroads to use.

SEC. 4. That all railroad companies desiring the use of the bridge authorized by this Act shall have and be entitled to equal rights and privileges relative to the passage of railway trains or cars over the same and over the approaches thereto upon the payment of a reasonable compensation for such use; and in case the owner or owners of said bridge and the several railroad companies, or any one of them, desiring such use shall fail to agree upon the sum or sums to be paid, and upon rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proof of the parties; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies.

Lawful structure and post route.

SEC. 5. That the bridge constructed, maintained, and operated under this Act and according to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transportation over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions over the railroads and public highways leading to said bridge; and the United States shall have the right of way for postal, telegraph, and telephone purposes over said bridge.

Postal telegraph, etc.

Commencement and completion.

SEC. 6. That this Act shall be null and void if actual construction of the said bridge be not commenced in one year and completed in three years from the date hereof.

Amendment.

SEC. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 12, 1901.

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February 12, 1901.

**CHAP. 358.—An Act Authorizing the Mount Carmel Development Company to draw water from Wabash River at Grand Rapids, Wabash County, Illinois.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Mount Carmel Development Company may draw water from Wabash River at Grand Rapids, Ill.

That the Mount Carmel Development Company, a corporation chartered by the State of Illinios as of the date of October twenty-sixth, nineteen hundred, be, and the same is hereby, authorized and empowered to draw, by canal, flume, or race, from the pool of the Grand Rapids dam of the Wabash River, in the county of Wabash and State of Illinois, such supply of water as may be necessary or required for the purposes of said corporation during the continuance of said corporation: *Provided*, That such withdrawal of water shall not be so great as to be detrimental to the navigation of said Wabash River, and shall be under the direction and control of the Secretary of War: *And provided further*, That the said corporation shall submit detailed plans, showing the location and method of construction of said canal, flume, or race, to

*Provisos.*
– control of supply, etc.

Secretary of War to approve plans.

the Secretary of War for approval; and until he shall approve the same the work hereby authorized shall not be commenced.

Approved, February 12, 1901.

**CHAP. 362.**—An Act To authorize the construction of a bridge across Rock River, Illinois.

February 12, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Moline and Peoria Railway Company, a corporation duly incorporated under the laws of the State of Illinois, its successors and assigns, be, and is hereby, authorized to construct and maintain, at a point suitable to the interests of navigation, a bridge for the passage of railroad traffic across Rock River, in section seventeen, township seventeen, range one, from Rock Island County to the opposite shore of said river, in Henry County, in the State of Illinois. That said bridge shall be built across said river, following the course of the main channel; that the location and plan or manner of constructing said bridge shall be subject to the approval of the Secretary of War, and until decided by him to be such as will not materially affect the interests of navigation, said bridge shall not be built. And there shall be submitted to the Secretary of War, for his examination and approval, a design and drawing of the proposed bridge, and a map of the location, giving the topography of the banks of the river, the shore line at high and low water, the direction and strength of the currents at all stages, and the soundings accurately showing the bed of the stream, the location of any other bridge, and all other information required; and should any change be made in the plan of said bridge during the progress of construction such change shall be subject to the approval of the Secretary of War. And the said structure shall at all time be so kept and managed, and be provided with such guard fences, sheer booms, and other structures as to offer reasonable and proper means for the passage of vessels and other floating crafts through or under said structure; and for the safety of vessels passing at night there shall be displayed on said bridge, from the hours of sunset to sunrise, such lights as may be prescribed by the Light-House Board; and the said structure shall be changed at the cost and the expense of the owners thereof, from time to time, as the Secretary of War may direct, so as to preserve the free and convenient navigation of said river.

Moline and Peoria Railway may bridge Rock River, Ill.

—location.

Secretary of War to approve plans.

Aids to navigation.

Lights.

Changes.

SEC. 2. That said bridge shall be constructed with unbroken and continuous spans, and the main span shall be over the main navigable channel of the river, and shall give a clear width of waterway not less than one hundred and sixty-five feet, and shall give clear headroom the full length of said span of not less in any case than thirty-six feet above extreme high-water mark, as understood at

Spans, etc.

the point of location. The remaining spans shall each give a clean width of waterway not less than one hundred and twenty-five feet, and a clear headroom not less in any case than seven feet between extreme high-water mark and the lower chords of the superstructure. Said bridge shall be constructed at right angles to and its piers parallel with the current of the river.

Commencement and completion.

SEC 3. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within twelve months and completed within three years from the date of the passage hereof.

Lawful structure and post route.

SEC. 4. That the bridge built under this Act, and subject to its limitations, shall be a lawful structure, and shall be known and recognized as a post route, upon which also no higher charge shall be made for the transportation over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions over the railroads and public highways leading to said bridge; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal-telegraph purposes: *Provided*, That all railroad companies desiring the use of the bridge authorized by this Act shall have and be entitled to equal rights and privileges relative to the passage of railway trains or cars over the same and over the approaches thereto upon the payment of a reasonable compensation for such use; and in case the owner or owners of said bridge and the several railroad companies, or any one of them, desiring such use shall fail to agree upon the sum or sums to be paid, and upon rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies.

Telegraph, etc., lines.

*Proviso.*
Right of railroads to use.

Amendment.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 12, 1901.

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February 12, 1901.

**CHAP. 364.—An Act To authorize Jefferson County, Arkansas, to construct and maintain a free bridge across the Arkansas River within five miles of Pine Bluff, Jefferson County, Arkansas.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the county of Jefferson, in the State of Arkansas, be, and is hereby, authorized to construct and maintain a road bridge for the free passage of wagons, vehicles, and pedestrians across the Arkansas River at such point as may be selected by such county and approved by the Secretary of War, within the boundary lines of Jefferson County, Arkansas, and within five miles of the city of

Jefferson County, Ark., may bridge Arkansas River, Ark.

—location, etc.

Pine Bluff, in said county, said bridge to be so constructed as not to obstruct the navigation of said river and to be provided with a suitable draw: *Provided*, That any bridge constructed under this Act and according to its limitations shall be a lawful structure, and shall be known and recognized as a post route, upon which, also, no higher charge shall be made for the transportation over the same of the mail, the troops, and munitions of war of the United States than the rate per mile paid for transportation over railroads or public highways leading to the said bridge; and the United States shall have the right of way for a postal telegraph across said bridge.

*Proviso.*
Lawful structure and post route.

Postal telegraph.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe; and the said county shall submit to the Secretary of War, for his examination and approval, a design and drawing of the proposed bridge and a map of the location, giving for the distance of one mile above and one-half mile below the proposed location the topography of the banks of the river, the shore line at high and low water, the direction and strength of the currents, and the soundings, accurately showing the bed of the stream, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plan and location of the bridge are approved by the Secretary of War no work upon the bridge shall be commenced; and should any change be made in the plan of said bridge during the progress of construction, or after completion, such change shall be subject to the approval of the Secretary of War.

Secretary of War to approve plans, etc.

—changes.

SEC. 3. That Congress reserves the right to alter, amend, or repeal this Act at any time; and if at any time navigation of said river shall in any manner be obstructed or impaired by the said bridge, the Secretary of War shall have authority, and it shall be his duty, to require the said county to alter and change the said bridge, at its own expense, in such manner as may be proper to secure free and complete navigation without impediment; and he may require the said county to build and maintain, at its own expense, such dikes, wing dams, booms, or other works, as in his opinion may be necessary to maintain the channel of the river within the drawspans of the bridge.

Amendment.

Alterations, etc.

SEC. 4. That the draw provided for the bridge herein authorized to be constructed shall be opened promptly, upon reasonable signal, for the passing of boats, which said county shall maintain at its own expense; and the said county shall maintain on said bridge from sunset to sunrise, at its own expense, such lights or other signals as the Light-House Board may prescribe; and if actual construction of the bridge herein authorized shall not be commenced within one year from the passage of this Act and be completed within three years from same date, the rights and privileges hereby granted shall cease and be determined.

Draw.

Lights.

Commencement and completion.

Approved, February 12, 1901.

February 12, 1901.

**CHAP. 365.—An Act Providing for the construction of a bridge across the Yalobusha River, in Grenada County, State of Mississippi.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Grenada County may bridge Yalobusha River, Miss.—location.

That the board of supervisors of Grenada County, State of Mississippi, be, and is hereby, authorized to construct and maintain a highway bridge and approaches thereto across the Yalobusha River at or near the center of southeast quarter of section eight, township twenty-two, range three east, just at the mouth of Martins Creek, in Grenada County, State of Mississippi, and about twelve miles west and below the city of Grenada.

Secretary of War to approve plans.

SEC. 2. That the said bridge shall be located and built subject to such regulations for the security of navigation as the Secretary of War may prescribe; and to secure that object the said board of supervisors shall submit for his examination a design and drawing of the proposed bridge and a map of its location; and until the said plan and location shall be approved by him the bridge shall not be commenced or built; and should any change be made in said bridge, either before or after completion, such change shall likewise be subject to the approval of the Secretary of War.

Aids to navigation.

Lights.

Changes.

SEC. 3. That said bridge shall be so kept and managed as to offer reasonable and proper means for the passage of boats and other craft through or under the same; and for the safety of vessels passing at night there shall be displayed on said bridge from sunset to sunrise such signal lights or other signals as the Light-House Board may prescribe. And any changes in the said bridge which the Secretary of War may at any time deem necessary and order in the interests of navigation shall be made by the said board of supervisors thereof at the expense of said Grenada County.

Lawful structure and post route.

Postal telegraph.

SEC. 4. That any bridge constructed under this Act shall be a legal structure and shall be known as a post road, over which no higher charge shall be made for the transportation of mails, troops, and munitions of war, or other property of the United States over the same than the rate per mile charged for their transportation over the railways of, and public highways leading to, said bridge. The United States shall also have the right of way over said bridge for postal telegraph purposes.

Commencement and completion.

SEC. 5. That this Act shall be null and void if the actual construction of said bridge shall not be commenced within one year and completed within three years after the date hereof.

Amendment.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 12, 1901.

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February 15, 1901.

**CHAP. 374.—An Act To authorize the United New Jersey Railroad and Canal Company and the Philadelphia and Trenton Railroad Company, or their successors, to construct and maintain a bridge across the Delaware River.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* United New Jersey Railroad and Canal Company, etc., may bridge Delaware River at Trenton, N. J., etc.

That the United New Jersey Railroad and Canal Company, a corporation existing under the laws of the State of New Jersey, and the Philadelphia and Trenton Railroad Company, a corporation existing under the laws of the State of Pennsylvania, or their successors, be, and they are hereby, authorized to construct, maintain, and operate a railroad bridge, with as many tracks as they shall deem necessary for railroad traffic, across the Delaware River between a point in or near the city of Trenton, in the State of New Jersey, and a point in or near the borough of Morrisville, in the county of Bucks and State of Pennsylvania.

Secretary of War to approve plans, etc.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such requirements for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the railroad company shall submit to the Secretary of War for his examination and approval a design and drawing of the bridge and a map of the location, giving for the space of one mile the depth and current of the river at all points and the location of any other bridge or bridges, together with all other information touching said bridge and river as may be deemed requisite by the Secretary of War to determine whether said bridge when built will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water.

Notification of approval, etc.

SEC. 3. That the Secretary of War is hereby authorized and directed, upon receiving said plan and map and upon being satisfied that a bridge built on such plan and at said locality will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water, to notify the said company that he approves the same, and upon receiving such notification the said company may proceed to the erection of said bridge, conforming strictly to the approved plan and location; but until the Secretary of War shall approve the plan and location of the said bridge and notify the said companies of the same in writing the bridge shall not be built or commenced; and should any change be made in the plan of the bridge during the progress of the work thereon or after completion such change shall be subject likewise to the approval of the Secretary of War.

Lawful structure and post route.

SEC. 4. That any bridge constructed under this Act shall be a legal structure and shall be known as a post road, over which no higher charge shall be made for the transportation of mails, troops, and munitions of war, or other property of the United States over the same than the rate per mile charged for their transportation over the railways of and public highways leading to said bridge. The United States shall also have the right of way over said bridge for postal-telegraph purposes.

Postal telegraph.

No obstruction to navigation.

SEC. 5. That the said bridge shall be so kept and managed at all times as not to interfere with the passage of vessels, barges, or rafts both by day and by night, and there shall be displayed on said bridge by the owners

Lights.

thereof, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe.

Commencement and completion.

SEC. 6. That this Act shall be null and void unless the bridge herein authorized shall be commenced within one year and completed within three years from the date hereof.

Amendment.

SEC. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 15, 1901.

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February 18, 1901.

**CHAP. 377.**—An Act Amending the Act providing for the appointment of a Mississippi River Commission, and so forth, approved June twenty-eighth, eighteen hundred and seventy-nine.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Mississippi River Commission.
Vol. 21, p. 38 amended.

That an Act entitled "An Act to provide for the appointment of a Mississippi River Commission, for the improvement of said river from the Head of the Passes near its mouth to its head waters," approved June twenty-eighth, eighteen hundred and seventy-nine, be amended by adding thereto the following section:

Offices of commission.
—meetings.

"SEC. 8. That the headquarters and general offices of said commission shall be located at some city or town on the Mississippi River, to be designated by the Secretary of War, and the meetings of the commission except such as are held on Government boats during the time of the semiannual inspection trips of the commission shall be held at said headquarters and general offices, the times of said meetings to be fixed by the president of the commission, who shall cause due notice of such meetings to be given members of the commission and the public."

Approved, February 18, 1901.

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February 18, 1901.

**CHAP. 378.**—An Act To authorize the Glassport Bridge Company to construct and maintain a bridge across the Monongahela River, in the State of Pennsylvania.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Glassport Bridge Company may bridge Monongahela River.
—location.
Lawful structure, etc.

That the Glassport Bridge Company, a corporation organized under the laws of the State of Pennsylvania, is hereby authorized to construct, maintain, and operate a bridge across the Monongahela River between a point on the eastern side of said river at or near Ninth street, in the borough of Port Vue, in the county of Allegheny, and a point on the western side of said river in the township of Jefferson, in said county, at or near the public road known as the River road, between Dravosburg and West Elizabeth. The said bridge, when built in accordance with the requirements of this Act, shall be a legal structure, and may be used for either or both railroad purposes or as a highway for the passage of persons, vehicles, and passenger cars.

Secretary of War to approve plans.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such requirements for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the railroad company shall submit to the Secretary of War, for his examination and approval, a design and drawing for the bridge, and a map of the location, giving for the space of one mile the depth and current of the river at all points, and the location of any other bridge or bridges, together with all other information touching said bridge and river as may be requisite for the Secretary of War to determine whether said bridge, when built, will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water.

Notification of approval, etc.

SEC. 3. That the Secretary of War is hereby authorized and directed, upon receiving said plan and map, and upon being satisfied that a bridge built upon said plan and at said location will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water, to notify the said company that he approves the same, and upon receiving said notification the said company may proceed to the erection of the said bridge, conforming strictly to the approved plan and location; and until the Secretary of War shall approve the plan and location of the said bridge and notify the said company, in writing, a bridge shall not be built or commenced; and should any change be made in the plan of the bridge during the progress of the work thereon, or after completion, such change shall be subject likewise to the approval of the Secretary of War. And any changes in said bridge which the Secretary of War may at any time deem necessary, and order in the interests of navigation, shall be made by the owners thereof at their own expense.

Changes.

Uses of bridge.

SEC. 4. That said bridge, at the option of the said Glassport Bridge Company, may be so constructed that the same can be used for the passage of wagons and vehicles of all kinds, and passenger cars, and for the transit of animals and foot passengers over the same, and also, in addition to these purposes, may be used for railroad purposes; and the company maintaining the same shall have the right to charge such reasonable rates for toll as bridge companies are authorized to collect under the laws of the State of Pennsylvania: *Provided*, That if said bridge shall be constructed for railroad purposes, all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railroad trains or cars over the same upon the payment of a reasonable compensation for such use, and in case the owner or owners of said bridge and the several railroad companies, or any one of them, desiring such use shall fail to agree upon the sum or sums to be paid, and upon the rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties.

Toll.

*Proviso.*
Rights of railroads to use.

Post route.

SEC. 5. That any bridge constructed under this Act shall be known as a post road, over which no higher charge shall be made for the transportation of mails, troops, and munitions of war, or other property of the United States, than the rate per mile charged for their transportation over the public highways leading to said bridge. The United States shall also have the right of way over said bridge for postal-telegraph purposes.

Postal telegraph.

Lights, etc.

SEC. 6. That the said bridge shall be so kept and managed at all times as not to interfere with the passage of vessels, barges, or rafts, both by day and by night, and there shall be displayed on said bridge by the owners thereof, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe.

Commencement and completion.

SEC. 7. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced in one year and completed within three years from the date hereof.

Amendment.

SEC. 8. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 18, 1901.

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February 18, 1901.

**CHAP. 381.—An Act Authorizing the Indiana, Illinois and Iowa Railroad Company to construct and maintain a bridge across Saint Joseph River at or near the city of Saint Joseph, Michigan.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Indiana, Illinois and Iowa Railroad Company, a corporation created and existing under and by virtue of the laws of the State of Illinois, be, and is hereby, authorized, to construct and maintain a railway bridge across Saint Joseph River at a point suitable to the interests of navigation, at or near the city of Saint Joseph, in the State of Michigan.

Indiana, Illinois and Iowa Railroad may bridge St. Joseph River at St. Joseph, Mich.

Lawful structure and post route.

SEC. 2. That said bridge built under this Act and subject to its limitations shall be a lawful structure and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and munitions of war of the United States than the rate per mile paid for the transportation over the railroad or public highways leading to the said bridge, and shall enjoy the rights and privileges of other post roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal telegraph purposes: *Provided*, That the bridge herein authorized to be constructed shall be so kept and managed by the company owning or operating it as to afford proper ways and means for the passage through or under it of vessels, barges, or rafts at all times, both by day and by night; and there shall be displayed on said bridge, from sunset to sunrise, such lights and signals as the Light-House Board shall prescribe.

Postal telegraph, etc.

*Proviso.* Aids to navigation.

Lights.

Rights of railroads to use.

SEC. 3. That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same and the approaches thereto upon payment of a reasonable compensation for such use; or, in case of disagreement, upon such terms and conditions as shall be prescribed by the Secretary of War upon hearing the allegations and proofs of the parties in interest.

Secretary of War to approve plans.

SEC. 4. That the bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the said company or corporation shall submit to the Secretary of War, for his examination and approval, a design and drawings of said bridge and a map of the location giving for the space of one mile above and one mile below the proposed location of the bridge the topography of the banks of the river, with shore lines at high and low water, the direction and strength of the currents at all stages, and the soundings, accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plans and location of the bridge are approved by the Secretary of War the bridge shall not be built; and should any change be made in the plan of said bridge during the process of contruction, such change shall be subject to the approval of the Secretary of War, and said structure shall be changed at the cost and expense of the owners thereof from time to time, as the Secretary of War may direct, so as to preserve the free and convenient navigation of said river.

Changes.

Commencement and completion.

SEC. 5. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date hereof.

Amendment.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 18, 1901.

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February 23, 1901.

**CHAP. 468.—An Act To authorize the Louisville and Nashville Railroad Company to construct, maint in, and operate a bridge across the Choctawhatchee River at Geneva, Alabama.**

Louisville and Nashville Railroad may bridge Choctawhatchee River at Geneva, Ala.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Louisville and Nashville Railroad Company, a corporation created and existing under the laws of the State of Kentucky, and doing business in the State of Alabama, its successors and assigns, be, and it is hereby, authorized and empowered to construct, maintain, and operate a bridge across the Choctawhatchee River at Geneva, Alabama, at such point as may have been or may hereafter be selected by said railroad company for crossing said river on its line of railroad, provided such point selected shall, in the judgment of the Secretary of War, be suitable to the interests of navigation; that said bridge shall be constructed for the passage of railroad trains, and

Railroad bridge.

said railroad company may locate, construct, maintain, and operate over said bridge and the approaches thereto railroad tracks for the use of said railroad company.

Lawful structure and post route.

SEC. 2. That said bridge shall be a lawful structure, subject to the limitations of this Act, and shall be recognized and known as a post route, upon which no higher charge shall be made for the transmission over the same of the mails, the troops, and munitions of war of the United States than the rate per mile to be paid for the same over the railroad leading to said bridge; and the United States shall have the right of way over said bridge for postal telegraph and telephone purposes.

Postal telegraph, etc.

Secretary of War to approve plans.

SEC. 3. That the bridge authorized to be constructed under this Act shall be built and located subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe, and to secure that object the said railroad company shall submit to the Secretary of War, for his examination and approval, a design and drawing of said bridge, with a map of the location thereof, and shall furnish such other information as may be required for the full and satisfactory understanding of the subject, and that said bridge shall not be built until the plans and location thereof shall be approved by the Secretary of War; and should any change be made in the plans of said bridge during the progress of its construction, or after its completion, such change shall be subject to the approval of the Secretary of War; and any changes in said bridge which the Secretary of War may at any time deem necessary, and order in the interests of navigation, shall be made by the owners thereof at their own expense: *Provided*, That if said bridge is constructed as a drawbridge the draw thereof shall be opened promptly upon reasonable signal for the passage of boats, and the said railroad company shall maintain thereon, at its own expense, between sunset and sunrise, such lights or other signals as may be prescribed by the Light-House Board.

Changes.

*Proviso.*
Draw.

Lights.

Rights of railroads to use.

SEC. 4. That all railroad companies desiring the use of the bridge authorized by this Act shall have and be entitled to equal rights and privileges relative to the passage of railway trains or cars over the same and over the approaches thereto upon the payment of a reasonable compensation for such use; and in case the owner or owners of said bridge and the several railroad companies, or any one of them, desiring such use shall fail to agree upon the sum or sums to be paid, and upon rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies.

Commencement and completion.

SEC. 5. That this act shall be null and void if actual construction of the said bridge be not commenced in one year and completed in three years from the date hereof.

Amendment.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 23, 1901.

**CHAP. 469.—An Act For the preparation of plans or designs for a memorial or statue of General Ulysses S. Grant on ground belonging to the United States Government in the city of Washington, District of Columbia.**

February 23, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the president of the Society of the Army of the Tennessee, the chairman of the Joint Committee on the Library, and the Secretary of War be, and they are hereby, created a commission to select a site and secure plans and designs for a statue or memorial of General Ulysses S. Grant, late President of the United States and General of the armies thereof, said statue not to cost in excess of the sum of two hundred and fifty thousand dollars.

Statue of Gen. U. S. Grant.
Selection of a site authorized.

SEC. 2. That said commission is authorized to select any unoccupied square or reservation belonging to the Government, or part thereof, in the District of Columbia, except the grounds of the Capitol and Library of Congress, on which to erect the said statue.

Use of Government reservation.

SEC. 3. That the said commission is authorized and required to advertise for plans, specifications, and models for the base, pedestal, and statue provided for in section one, and may pay to competing artists for the same and for expenses incident to making such selection, a sum not exceeding ten thousand dollars, which sum is hereby appropriated, out of any money in the Treasury not otherwise appropriated, one of which plans, specifications, or models shall, if deemed sufficiently meritorious by the commission, be selected, or the commission may select any part of any of the plans, specifications, or models that it may elect and that it can use.

Plans, etc.

SEC. 4. That as soon as practicable after the selection authorized by section three is made, said commission shall report their action to the Congress of the United States.

Report.

Approved, February 23, 1901.

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**CHAP. 470.—An Act To declare a branch of the Mississippi River opposite the city of La Crosse Wisconsin, and known as West Channel, to be unnavigable, and that the said city be relieved of necessity of maintaining a draw or pontoon bridge over said West Channel.**

February 23, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the branch of the Mississippi River flowing between Grand Island and the mainland opposite the city of La Crosse, State of Wisconsin, and known as the West Channel, be, and the same is hereby, declared unnavigable, and the said city of La Crosse is, from and after the passage of this Act, relieved of the necessity of maintaining a draw or pontoon bridge over said West Channel.

Mississippi River.
West channel declared unnavigable.
City of La Crosse exempted from maintaining bridge.

Approved, February 23, 1901.

February 25, 1901.

**CHAP. 473.**—An Act Granting authority to Alafia, Manatee and Gulf Coast Railroad Company to build railroad bridges across the Manatee River and Gasparilla Sound and to lay railroad tracks thereon.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Alafia, Manatee and Gulf Coast Railroad may bridge Manatee River and Gasparilla Sound, Fla.

That the Alafia, Manatee and Gulf Coast Railroad Company, a railroad corporation organized under the law of Florida, be, and it hereby is, authorized and empowered to construct, maintain, and operate one bridge across each of the following rivers and bodies of water, all in the State of Florida: The Manatee River from a point at or near Palmetto, in the county of Manatee, to a point at or near Braidentown, in said county, and also over and across Gasparilla Sound from a point on the mainland, in the county of De Soto, to a point near or opposite thereto at or near the head of north end of Gasparilla Island, and to lay railroad tracks on the said bridges to run trains on same.

Lawful structures and post routes.

SEC. 2. That any bridges built under this Act and subject to its limitations shall be lawful structures and shall be recognized and known as post routes, upon which also no higher charge shall be made for the transportation over the same of the mail, the troops, and munitions of war of the United States than the rate per mile paid for transportation over railroads or public highways leading to the said bridge, and they shall enjoy the same rights and privileges as other post roads in the United States, and equal privileges in the use of said bridges shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across the said bridges and their approaches for postal-telegraph purposes.

Telegraph, etc., companies.

Right of railroads to use.

SEC. 3. That all railroad companies desiring the use of said bridges shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same and over the approaches thereto, upon the payment of a reasonable compensation for such use; and in case the owner or owners of said bridges and the several railroad companies, or any of them desiring such use, shall fail to agree upon the sum or sums to be paid and upon the rules and conditions to which each shall conform in using said bridges, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the party.

Secretary of War to approve plans, etc.

SEC. 4. That all bridges authorized to be constructed under this Act shall be built under and subject to such regulations for the security of the navigation of said river and sound as the Secretary of War shall prescribe, and to secure that object the said company or corporation shall submit to the Secretary of War, for his examination and approval, maps of location and designs and drawings of each of the bridges; and until plans and locations are approved by the Secretary of War the bridges shall not be commenced or built; and should any changes be made in the plans of said bridges or any one of them during the progress of the construction or after completion, such

Changes.

changes shall be subject to the approval of the Secretary of War, and all changes in said bridges, or any one of them, required by the Secretary of War, at any time or until their entire removal, shall be made promptly by the corporations or persons owning or operating said bridges at their expense. And the said persons or corporations shall maintain on said bridges, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe.

**Lights.**

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

**Amendment.**

SEC. 6. That this Act shall be null and void if actual construction of the bridges herein authorized is not commenced within one year and completed within three years from the date hereof.

**Commencement and completion.**

Approved, February 25, 1901.

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February 25, 1901.

**CHAP. 475.—An Act To authorize the Mobile and West Alabama Railroad Company to construct and maintain a bridge across the Warrior River, between the counties of Walker and Jefferson, in section thirty-five, township seventeen, range seven west, Alabama.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Mobile and West Alabama Railroad Company, a corporation created and existing under an act of the general assembly of the State of Alabama, be, and is hereby, authorized to construct and maintain a railroad bridge for the passage of railway engines and cars across the Warrior River, at such point as may be selected by such company, in section thirty-five, township seventeen, range seven west, and approved by the Secretary of War, between the counties of Walker and Jefferson, Alabama, said bridge to be so constructed as not to obstruct the navigation of said river, and to be provided with a suitable draw: *Provided,* That any bridge constructed under this Act and according to its limitations shall be a lawful structure and shall be known and recognized as a post route, upon which, also, no higher charge shall be made for the transportation over the same of the mail, the troops, and munitions of war of the United States than the rate per mile paid for transportation over railroads or public highways leading to the said bridge; and the same is hereby declared to be a post route, and the United States shall have the right of way for a postal telegraph across said bridge: *Provided, also,* That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains or cars over the same, and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case of any disagreement between the parties in regard to the terms of such use or the sums to be paid, all matters at issue shall be determined by the Secretary of War upon hearing the allegations and proofs submitted to him.

**Mobile and West Alabama Railroad may bridge Warrior River, Ala.**

**Draw, etc.**

*Provisos.*
**Lawful structure and post route.**

**Rights of railroads to use.**

Secretary of War to approve plans

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe; and the said company or corporation shall submit to the Secretary of War, for his examination and approval, a design and drawing of the proposed bridge and a map of the location, giving, for the space of one-half mile above and one-half mile below the proposed location, the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the currents, and the soundings, accurately showing the bed of the stream, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plan and location of the bridge are approved by the Secretary of War no work upon the bridge shall be commenced; and should any change be made in the plan of said bridge during the progress of construction or after completion, such change shall be subject to the approval of the Secretary of War.

Amendment. Alterations.

SEC. 3. That Congress reserves the right to alter, amend, or repeal this Act at any time; and that if at any time navigation of said river shall in any manner be obstructed or impaired by the said bridge the Secretary of War shall have authority, and it shall be his duty, to require the said bridge company to alter and change the said bridge, at its own expense, in such manner as may be proper to secure free and complete navigation without impediment.

Draw.

Lights.

SEC. 4. That the draw provided for the bridge herein authorized to be constructed shall be opened promptly, upon reasonable signal, for the passing of boats; and said company or corporation shall maintain, at its own expense, from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe.

Telegraph, etc., companies.

Commencement and completion.

SEC. 5. That all telephone and telegraph companies shall be granted equal rights and privileges in the construction and operation of their lines across said bridge; and if actual construction of the bridge herein authorized shall not be commenced within one year from the passage of this Act, and be completed within three years from same date, the rights and privileges hereby granted shall cease and be determined.

Approved, February 25, 1901.

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February 25, 1901.

**CHAP. 476.—An Act To authorize the Mobile and West Alabama Railroad Company to construct and maintain a bridge across the Tombigbee River between the counties of Marengo and Choctaw, below Demopolis, Alabama.**

Mobile and West Alabama Railroad may bridge Tombigbee River, Ala.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Mobile and West Alabama Railroad Company, a corporation created and existing under an Act of the general assembly of the State of Alabama, be, and is hereby, authorized to construct and maintain a railroad bridge for the passage of railway engines and cars across the Tombigbee River at a point suitable to the interests of navigation between Marengo and Choctaw counties, below Demopolis, in the State of Alabama, said bridge to be so constructed as not to obstruct the navigation of said river and to be provided with a suitable draw: *Provided*, That any bridge constructed under this Act and according to its limitations shall be a lawful structure and shall be known and recognized as a post route, and the same is hereby declared to be a post route, upon which, also, no higher charge shall be made for the transportation over the same of the mails, the troops, or munitions of war of the United States than the rate per mile paid for transportation over railroads or public highways leading to the said bridge, and the United States shall have the right of way for a postal telegraph across said bridge: *Provided, also*, That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains or cars over the same, and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case of any disagreement between the parties in regard to the terms of such use or the sums to be paid, all matters at issue shall be determined by the Secretary of War, upon hearing the allegations and proofs submitted to him.

Draw, etc.

*Provisos.*
Lawful structure and post route.

Postal telegraph.

Rights of railroads to use.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe; and the said company or corporation shall submit to the Secretary of War, for his examination and approval, a design and drawing of the proposed bridge and a map of the location, giving for the space of one-half mile above and one-half mile below the proposed location the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the currents, and the soundings accurately showing the bed of the stream, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and, until the said plan and location of the bridge are approved by the Secretary of War, no work upon the bridge shall be commenced; and should any change be made in the plan of said bridge during the progress of construction or after completion, such change shall be subject to the approval of the Secretary of War.

Secretary of War to approve plans, etc.

SEC. 3. That Congress reserves the right to alter, amend, or repeal this Act at any time; and if at any time navigation of said river shall in any manner be obstructed or impaired by the said bridge, the Secretary of War shall have authority, and it shall be his duty, to require the said bridge company to alter and change the said bridge, at its own expense, in such manner as may be proper to secure free and complete navigation without impediment.

Amendment.
Alterations.

SEC. 4. That the draw provided for the bridge herein authorized to be constructed shall be opened promptly, upon reasonable signal, for the passing of boats, and said company or corporation shall maintain at its own expense,

Draw.

Lights.

from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe.

Telegraph, etc., companies.

SEC. 5. That all telephone and telegraph companies shall be granted equal rights and privileges in the construction and operation of their lines across said bridge: and if actual construction of the bridge herein authorized shall not be commenced within one year from the passage of this Act, and be completed within three years from same date, the rights and privileges hereby granted shall cease and be determined.

Commencement and completion.

Approved, February 25, 1901.

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February 25, 1901.

**CHAP. 477.—An Act To authorize the construction of a bridge across Little River, at or near mouth of Big Lake, State of Arkansas.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Jonesboro, Lake City and Eastern Railroad Company, a corporation incorporated under the laws of the State of Arkansas, its successors or assigns, are hereby authorized to construct, operate, and maintain a drawbridge across Little River, at or near the mouth of Big Lake, in section nine, township fourteen north, range nine east, Mississippi County, in the State of Arkansas. Said bridge shall be constructed in accordance with such plans as the Secretary of War may decide to be necessary, and approved by him: *Provided*, That before the construction of any bridge herein authorized is commenced the said company shall submit to the Secretary of War, for his examination and approval, a design and drawing of such bridge, and map of the location, giving sufficient information to enable the Secretary of War to fully and satisfactorily understand the subject; and unless the plan and location of such bridge are approved by the Secretary of War the structure shall not be built; and should any change be made in said bridge, before or after completion, such changes shall be likewise subject to the approval of the Secretary of War. And any changes in said bridge which the Secretary of War may at any time deem necessary, and order in the interests of navigation, shall be made by the owners thereof at their own expense: *Provided further*, That any bridge constructed under authority of this Act shall at all times be so kept and managed as to offer proper and reasonable means for the passage of vessels and other water craft through or under said structure; and the piers of said bridge shall be parallel with, and the bridge itself at right angles to, the currents of the river; and for the safety of vessels passing at night there shall be displayed on said bridge, from sunset to sunrise, such lights or other signals as may be prescribed by the Light-House Board; and the said company shall, at its own expense, build and maintain such dikes, wing dams, or other works as the Secretary of War may deem necessary to maintain the channel within the draw or channel spans of the bridge.

Jonesboro, Lake City and Eastern Railroad may bridge Little River, Arkansas.

Secretary of War to approve plans.

*Provisos.*

Changes.

Aids to navigation, etc.

Lights.

Wing dams, etc.

Right of railroads to use.

SEC. 2. That all railroad companies desiring the use of said bridge shall have equal rights and privileges relative to the passage of railway trains over the same and over the approaches thereto, upon payment of a reasonable compensation for such use; and in case the owner of said bridge and any railroad company desiring such use shall fail to agree upon the sums to be paid or upon the conditions to be observed, all matters at issue shall be decided by the Secretary of War upon hearing the allegations and proof of the parties.

Lawful structure and post route.

Postal telegraph, etc.

SEC. 3. That the bridge constructed, maintained, and operated under this Act and according to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transportation over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions over the railroads and public highways leading to said bridge; and the United States shall have the right of way for postal, telegraph, and telephone purposes over said bridge.

Commencement and completion.

SEC. 4. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within two years from the approval of this Act.

Amendment.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 25, 1901.

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February 26, 1901.

**CHAP. 607.—An Act To amend section twelve hundred and twenty-five of Revised Statutes so as to provide for detail of retired officers of the Army and Navy to assist in military instruction in schools.**

Retired Army and Navy officers.

Whereas the national defense must depend upon the volunteer service of the people of the several States; and

Whereas those schools which shall adopt a system of military instruction are entitled to the assistance of the Government in order to secure to the United States such a knowledge of military affairs among the youth of the country as will render them efficient as volunteers if called upon for the national defense: Therefore,

Detail authorized as instructors in drill, etc., in schools.

R. S., sec. 1225, p. 216, amended.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That section twelve hundred and twenty-five of the Revised Statutes, concerning the detail of officers of the Army and Navy to educational institutions be, and the same is hereby, amended so as to permit the President to detail under the provisions of that Act, and in addition to the detail of the officers of the Army and Navy now authorized to be detailed under the existing provisions of said Act, such retired officers of the Army and Navy of the United States as in his judgment may be required for that purpose, to act as instructors in military drill and tactics in schools in the United States, where such instruction shall have been authorized by the educational authorities thereof, and where the services of such instructors shall have been applied for by said authorities.

Payments to officers by school.

SEC. 2. That no detail shall be made under this Act to any school unless it shall pay the cost of commutation of quarters of the retired officers detailed thereto and the extra-duty pay to which the latter may be entitled by law to receive for the performance of special duty: *Provided*, That no detail shall be made under the provisions of this Act unless the officers to be detailed are willing to accept such position without compensation from the Government other than their retired pay.

*Proviso.* —by United States.

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Effect.

SEC. 4. That this Act shall take effect immediately.

Approved, February 26, 1901.

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February 26, 1901.

**CHAP. 608.—An Act To authorize the Carolina Northern Railroad Company to construct and maintain a bridge across the Lumber River in or near the town of Lumberton, Robeson County, North Carolina.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Carolina Northern Railroad Company, a corporation created and existing under an act of the general assembly of North Carolina, be, and is hereby, authorized to construct and maintain a railroad bridge for the passage of railway engines and cars across the Lumber River at such point as may be selected by such company and approved by the Secretary of War within the boundary lines of Robeson County, North Carolina, in or near the town of Lumberton: *Provided*, That said bridge shall not be constructed within one mile of any other bridge across said stream; said bridge to be so constructed as not to obstruct the navigation of said river and to be provided with a suitable draw: *Provided further*, That any bridge constructed under this Act and according to its limitations shall be a lawful structure and shall be known and recognized as a post route, and the same is hereby declared to be a post route, upon which, also, no higher charge shall be made for the transportation over the same of the mails, the troops and munitions of war of the United States than the rate per mile paid for transportation over railroads or public highways leading to the said bridge, and the United States shall have the right of way for a postal telegraph across said bridge.

Carolina Northern Railroad may bridge Lumber River at Lumberton, N.C.

*Provisos.*

Draw, etc.

Lawful structure and post route.

Postal telegraph.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe; and the said company or corporation shall submit to the Secretary of War, for his examination and approval, a design and drawing of the proposed bridge and a map of the location, giving, for the space of one-fourth of a mile

Secretary of War to approve plans.

Changes.

Proviso.

Existing law unimpaired.

above and one-fourth of a mile below the proposed location, the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the currents, and the soundings, accurately showing the bed of the stream, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until the said plan and location of the bridge are approved by the Secretary of War no work upon the bridge shall be commenced; and should any change be made in the plan of said bridge during the progress of construction such change shall be subject to the approval of the Secretary of War: *Provided*, That nothing in this Act shall be construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers, or to exempt this bridge from the operations of the same.

Amendment.

Alterations.

SEC. 3. That Congress reserves the right to alter, amend, or repeal this Act at any time; and that if at any time navigation of said river shall in any manner be obstructed or impaired by the said bridge, the Secretary of War shall have authority, and it shall be his duty, to require the said bridge company to alter and change the said bridge, at its own expense, in such manner as may be proper to secure free and complete navigation without impediment.

Draw.

Lights.

Commencement and completion.

SEC. 4. That the draw provided for the bridge herein authorized to be constructed shall be opened promptly, upon reasonable signal, for the passing of boats, and said corporation shall maintain at its own expense, from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe; and if actual construction of the bridge herein authorized shall not be commenced within one year from the passage of this Act and be completed within three years from same date the rights and privileges hereby granted shall cease and be determined.

Approved, February 26, 1901.

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February 27, 1901.

**CHAP. 613.**—An Act Amending an Act entitled "An Act authorizing the construction of a bridge over the Mississippi River to the city of Saint Louis, in the State of Missouri, from some suitable point between the north line of Saint Clair County, Illinois, and the southwest line of said county," approved March third, anno Domini eighteen hundred and ninety-seven.

Bridge of East St. Louis and St Louis Bridge and Construction Company over Mississippi River, St. Louis, Mo.

Vol. 29, p. 685, amended.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That section one of said Act be amended to read as follows: "That the consent of Congress is hereby given to the East Saint Louis and Saint Louis Bridge and Construction Company, of the city of East Saint Louis, of the county of Saint Clair and State of Illinois, a corporation organized under the laws of the State of Illinois, its assigns, successors, grantees, mortgagees, representatives, and successors in interest, to build, own, operate, and maintain a bridge and approaches thereto, as hereinafter described, across the Mississippi River, from some point between the north line of Saint Clair County, Illinois, and the southwest line of said county to the city of Saint Louis, State of Missouri: *Provided*, That the plan of said bridge be approved by the Secretary of War: *Provided also*, That said proposed bridge shall be constructed for the purpose of providing for the passage of wagons, vehicles, street cars, animals, and foot passengers, and shall, at the option of the said East Saint Louis and Saint Louis Bridge and Construction Company, be so constructed of sufficient strength and dimensions as to provide for the passage over it of railway, passenger, and freight trains and the accommodation of a track or tracks therefor, but in either event the piers of said bridge shall be built of sufficient strength to admit of the passage of railway, freight, and passenger trains over it, and said bridge shall be deemed and taken as a public highway for the purposes named only, subject to the provisions hereinafter set forth: *Provided also*, That street and other railway companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of cars over the same and over the approaches thereto, and in case the owner or owners of said bridge and the railway companies, or any of them, desiring such use shall fail to agree upon the rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon hearing the allegations and proofs of the parties in question."

*Provisos.* Secretary of War to approve plans. Transit, etc.

Use by street railways.

Lawful structure and post route.

SEC. 2. That section two of said Act be amended so as to read as follows: "That any bridge built under this Act shall be a lawful structure and shall be recognized and known as a post route; that no charge shall be made for the transmission over the same of the mails, troops, and the munitions of war of the United States, and it shall enjoy the rights and privileges of other post roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridge and its approaches for postal-telegraph purposes."

Telegraph, etc., companies.

Construction. Below Eads Bridge.

SEC. 3. That section three shall be so amended as to read as follows: "That in case the said bridge shall be built below the bridge heretofore constructed and known as the Eads Bridge it shall be built with an unbroken and continuous single span, and the lowest part of said span shall not be of less elevation in any case than seventy-five feet above the Saint Louis city directrix; and in case the said bridge shall be built above the said Eads Bridge, and immediately north thereof with the piers of the same opposite those of the Eads Bridge, so that they may be continuous thereto with three fixed channel spans giving the same clear width of waterway between piers as there is now between those of the Eads Bridge, and the said East Saint Louis and Saint Louis Bridge and Construction Company shall have the option of constructing said pro-

—above.

Spans.

posed bridge at or near the foot of Mullanphy street, in the city of St. Louis, but in that case there shall be at least three fixed channel spans, the west span to have a clear waterway of seven hundred feet and the other two channel spans to have a clear waterway of five hundred feet, each measured at right angles to the current at any and all stages of water; and the lowest part of said spans shall not be of less elevation in any case than fifty feet above the Saint Louis city directrix, plus the slope of the river from the foot of Walnut street, in the city of Saint Louis, to the point where the bridge shall be built; and the piers of the said bridge shall be parallel with the current of the river: *Provided*, That all shore piers and bridge approaches shall be so located and constructed as not to interfere with the use of any existing railroad right of way, depot grounds, or railroad yards."

*Proviso.* Existing railroad rights unimpaired.

Piers.

SEC. 4. That section four of said Act shall read as follows: "That the piers of all high channel spans shall be built parallel with the current of the river at the stage of the water which is most important to navigation; and riprapping or any other protection for imperfect foundations which will materially lessen the waterway or which may injure navigation shall not be employed in the channel ways of the high spans, and any piers which will produce cross currents or bars dangerous to navigation shall not be constructed; and if, after construction, any piers or protection walls are found to produce the above-mentioned effects, the nuisance shall be abated or corrected by or at the expense of the persons owning said bridge; and the approaches to the channel spans mentioned in this Act shall provide sufficient waterway for the passage of floods."

Lights.

SEC. 5. That section five of said Act be so amended as to read as follows: "That the persons owning, controlling, or operating the bridge authorized by this Act shall maintain, at their own expense, from sunset to sunrise throughout the year and during the heavy fogs, such lights or other signals as the Government Light-House Board shall prescribe, and shall also each day during the season of navigation have posted in a conspicuous place the clear headroom under the channel span on that day, the figures expressing this height to be readily visible to the naked eye from any point in the channel of the river for a stretch of four thousand feet, of which three thousand feet shall be above and one thousand feet shall be below the channel spans of the bridge."

Headroom notices.

Unobstructed navigation.

SEC. 6. That section six of said Act shall be amended to read as follows: "That no bridge shall be constructed, erected, or maintained under the authority of this Act which shall at any time substantially or materially obstruct the navigation of said river; and if any bridge erected under such authority shall, in the opinion of the Secretary of War, materially obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will obviate such obstruction; and all such alterations and changes shall be made and all obstructions removed at the expense of the persons owning or controlling such bridge; and in case of any litigation arising from any obstruction or alleged obstruction to the navigation of said river, caused or alleged to be caused by said bridge, the case shall be brought and tried in the circuit court of the United States for the southern district of Illinois."

Litigation.

Secretary of War to approve plans.

SEC. 7. That section seven of said Act shall be so amended as to read as follows: "That the bridge authorized to be constructed under this Act shall be built under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe; and the said company or corporation shall submit to the Secretary of War, for his examination and approval, a design and drawings of the bridge and a map of the location, giving for a sufficient distance above and below the bridge the topography of the banks of the river, the shore lines at high and low water, the direction and strength of the current at low, medium, and high water stages, and the soundings accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject, and until the said plan of the bridge is approved by the Secretary of War the bridge shall not be built; and should any changes be made in the plan of said bridge during the progress of the construction of the same such changes shall be subject to the approval of the Secretary of War."

Commencement and completion, time extended.

SEC. 8. That section eight of said Act shall be amended to read as follows: "That in case the construction of the bridge authorized by this amendatory Act shall not be commenced within one year and completed within three years from the date of the approval of this amendatory Act, then Congress may declare the same null and void."

Purpose for authorizing bridge.

SEC. 9. That section nine of said Act shall be amended to read as follows: "That the principal reason for giving authority to build the bridge herein contemplated is declared to be to secure reasonable rates and tolls to that class of traffic described in section one of this Act for the passage over the same, and to facilitate the transaction of business across the Mississippi River at the city of Saint Louis."

Transportation.

SEC. 10. That section ten of said Act shall be amended to read as follows: "That said corporation may transport on said bridge and approaches thereto persons and property of the class prescribed herein, and may allow others so to do; and said bridge and approaches may be used for the transportation of all that class of persons and property described in this Act, under such regulations as the board of directors or board of managers of said corporation or the parties owning the said bridge may prescribe. The corporation owning the said bridge may take, receive, and collect such rates and tolls for travel, passage, or transportation over said bridge and approaches as the directors of the corporation owning or controlling said bridge may from time to time fix and establish: *Provided*, That the rates charged for such travel, passage, or transportation

Tolls.

*Proviso.*
Rates prescribed.

shall not exceed the following, to wit: For each freight car, loaded or unloaded, three dollars; for each passenger car, exclusive of the passengers riding therein, three dollars; for each passenger over five years of age crossing in any passenger car, fifteen cents; for each foot passenger over five years of age, three cents; for every person on horseback, including horse, seven cents; for every gig, buggy, carriage, cart, or wagon drawn by one animal, ten cents; for every buggy, carriage, cart, or wagon drawn by two animals, twenty cents; for every buggy, carriage, cart, or wagon drawn by three animals, twenty-five cents; for every buggy, carriage, cart, or wagon drawn by four animals, thirty cents; for every buggy, carriage, cart, or wagon, drawn by more than four animals, five cents extra for each animal; for each head of cattle, horses, mules, or other animals other than those attached to vehicles, ten cents; for each head of sheep or swine, five cents. In case said corporation owning or controlling said bridge shall operate a street-car line, or permit any street-car company to operate a street-car line on said bridge and approaches, the fare for a single passenger over said bridge for persons over five years of age shall not exceed five cents."

**Amendment.**

SEC. 11. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

**Repeal.**

SEC. 12. That all Acts or parts of Acts in conflict with this Act are hereby repealed.

Approved, February 27, 1901.

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**February 27, 1901.**

**CHAP. 614.—An Act To amend an act granting to railroads the right of way through the public lands of the United States, approved March third, eighteen hundred and seventy-five.**

**Minnesota.**

**Certain water-reserve lands declared subject to railroad rights of way on public lands.**

**Vol. 18, p. 482.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That all lands in the State of Minnesota described in and withdrawn from sale by the proclamations of the President of the United States for the reason that said lands would be required for or subject to flowage in the construction of dams, reservoirs, and other works proposed to be erected for the improvement of the navigation of the Mississippi River and certain of its tributaries, be, and the same are hereby, declared to be, and to have been at all times heretofore, subject to the provisions of a certain Act of Congress entitled "An Act granting to railroads the right of way through the public lands of the United States," approved March third, eighteen hundred and seventy-five, as fully, effectually, and to the same extent as though said lands had not been described in said proclamations, or withdrawn from sale thereby, but had remained with the body of public lands subject to private entry and sale: *Provided, however,* That any and all parts of said lands acquired by any railroad company under said Act of Congress shall at all times be subject to the right of flowage which at any time may become necessary in the construction or maintenance of dams,

***Provisos.***

**Right of flowage for improvement of Mississippi River reserved.**

reservoirs, or other works which may be constructed or erected by or under the authority of the United States for the improvement of the navigation of the Mississippi River and its tributaries: *Provided further*, That the railroad companies availing themselves of this Act shall, in addition to filing the maps now required by law to be filed, also file maps of definite location with elevation of rail of their lines of railroad over said water-reserve lands in the office of the Secretary of War; and no location shall be permitted which takes for right of way or stations or interferes with submergence of lands needed for the use of the present reservoir system, or in the construction of dams or other works, or any proposed or probable extension of the same, or which will obstruct or increase the cost of the present or prospective reservoir system: *Provided further*, That the plan for the location and construction of any such railway, or any part thereof, shall be first submitted to the Secretary of War and approved by him and by the Chief of Engineers of the United States Army.

Railroads to file maps of definite location.

—locations prohibited.

Secretary of War to approve plans.

Approved, February 27, 1901.

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February 28, 1901.

**CHAP. 619.—An Act Authorizing the Secretary of the Interior to sell a certain lot in the District of Columbia at public auction.**

District of Columbia.

Secretary of Interior authorized to sell lot 10, square 1041.

Disposition of proceeds of sale.

Payment to J. H. Gause, etc.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Interior be, and he is hereby, authorized and directed to forthwith offer at public auction, upon such terms as are usual in sales of real estate made by trustees appointed by the supreme court of the District of Columbia, all the right, title, interest, and estate of the United States in and to a certain lot of land in the city of Washington, District of Columbia, known upon the plat or plan of said city as lot numbered ten, in square numbered one thousand and forty-one. And upon the full compliance of the purchaser or purchasers with the terms of said sale, to execute and deliver to such purchaser or purchasers a deed of said lot, conveying the aforesaid interest of the United States therein. And out of the proceeds of such sale the Secretary of the Interior shall pay, or caused to be paid, to John H. Gause and Charles E. Gause such sum or sums as they, or either of them, have expended, laid out, and become liable for in the purchase of such title to the aforesaid lot as they have, including such amounts as they have paid to the District of Columbia for general and special taxes levied upon said lot, the cost of examinations of its title and the cost of attempting to perfect same. And the Secretary of the Interior shall, out of the proceeds of sale, also pay, or cause to be paid, to Charles G. Stott, such sum or sums as he or his predecessors in title have expended, laid out, and become liable for in the purchase of such title to the aforesaid lot as he acquired, including such amounts as he or his predecessors in the title that he has have paid to the District of Columbia for general and special taxes levied upon said lot, the cost of examinations of such title, and the cost of attempting to perfect same, if any. The balance of said proceeds of sale shall be covered into the Treasury by the Secretary of the Interior, to the credit of the United States.

Approved, February 28, 1901.

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**CHAP. 669.—An Act To authorize the Fourth Pool Connecting Railroad Company to construct and maintain a bridge across the Monongahela River.**

March 1, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Fourth Pool Connecting Railroad Company, a corporation existing under the laws of the State of Pennsylvania, is hereby authorized to construct, maintain and operate a railroad bridge, with one or more tracks, for railroad traffic across the Monongahela River, between a point in the township of Allen, in the county of Washington, and a point in the township of Washington, in the county of Fayette. The said bridge when built in accordance with the requirements of this Act shall be a legal structure and may be used for railroad and highway purposes.

Fourth Pool Connecting Railroad may bridge Monongahela River.

—location.

Lawful structure.

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such requirements for the security of navigation of said river as the Secretary of War shall prescribe; and to secure that object the railroad company shall submit to the Secretary of War for his examination and approval a design and drawing of the bridge and a map of the location, giving for the space of one mile above and one-half mile below the proposed location, the topography of the banks of the river and the shore lines at high and low water. This map shall be accompanied by others drawn on a scale of one inch to two hundred feet, giving for a space of one-half a mile above the line of the proposed bridge and a quarter of a mile below, an accurate representation of the bottom of the soundings, and also showing over the whole width of this part of the river the force and direction of the currents at low water, at high water, and at least one intermediate stage, by triangulated observations on suitable floats, together with all other information touching said bridge and river as may be deemed requisite by the Secretary of War to determine whether said bridge when built will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water.

Secretary of War to approve plans.

SEC. 3. That the Secretary of War is hereby authorized and directed, upon receiving said plan and map and upon being satisfied that a bridge built on such plan and at said locality will conform to the provisions of this Act and

Notification to company, etc.

Changes.

cause no serious obstruction to the navigation of the river or injuriously affect the flow of water, to notify the said company that he approves the same, and upon receiving such notification the said company may proceed to the erection of said bridge, conforming strictly to the approved plan and location; but until the Secretary of War shall approve the plan and location of the said bridge, and notify the said company of the same in writing, the bridge shall not be built or commenced; and should any change be made in the plan of the bridge during the progress of the work thereon such change shall be subject likewise to the approval of the Secretary of War.

Transit.

Toll.

*Proviso.*

Rights of railroads to use.

SEC. 4. That said bridge, at the option of the railroad company, may be constructed so that the same can be used for the passage of wagons and vehicles of all kinds, and for the transit of animals and for foot passengers over the same, and may be also used for that purpose in addition to railroad purposes, and the company maintaining the same shall have the right to charge such reasonable rates of toll as bridge companies are authorized to collect under the laws of Pennsylvania: *Provided*, That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same, and over approaches thereto, upon payment of a reasonable compensation for such use; and in case the owner or owners of said bridge and the several railroad companies, or any of them, desiring such use shall fail to agree upon the sum or sums to be paid and upon rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties.

Lawful structure and post routes.

Postal telegraph.

SEC 5. That any bridge constructed under this Act shall be a legal structure and shall be known as a post road, over which no higher charge shall be made for the transportation of mails, troops and munitions of war, or other property of the United States over the same than the rate per mile charged for their transportation over the railways of, and public highways leading to, said bridge. The United States shall also have the right of way over said bridge for postal telegraph or telephone purposes.

No obstruction to navigation.

Lights.

Changes.

SEC. 6. That the said bridge shall be so kept and managed at all times as not to interfere with the passage of vessels, barges, or rafts both by day and by night; and there shall be displayed on said bridge by the owners thereof, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe; and such changes may be made from time to time in the structure of said bridge as the Secretary of War may direct, at the expense of said railroad company in order the more effectually to preserve the free navigation of said river, or the said structure shall be altogether removed, if in the judgment of the Secretary of War the public good may require such removal, and without expense or charge to the United States.

SEC. 7. That this Act shall be null and void if actual construction of said bridge be not commenced within one year and completed within three years from the date of the approval of this Act.

Commencement and completion.

SEC. 8. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 1, 1901.

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**CHAP. 670.—An Act Making appropriations to provide for the expenses of the government of the District of Columbia or the fiscal year ending June thirtieth, nineteen hundred and two, and for other purposes.**

March 1, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the half of the following sums named, respectively, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, and the other half out of the revenues of the District of Columbia, for the purposes following, being for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and two, namely:

District of Columbia.
Appropriations.
Half from District revenues.

## GENERAL EXPENSES.

General expenses.
Executive office.
Commissioners, secretary, etc.

FOR EXECUTIVE OFFICE: For two Commissioners, at five thousand dollars each; Engineer Commissioner, one thousand seven hundred and sixty-eight dollars (to make salary five thousand dollars); * * *

* * * * *

## WASHINGTON AQUEDUCT.

Washington Aqueduct.

For operation, maintenance, and repair of the aqueduct and its accessories, including Conduit road, twenty-two thousand dollars.

Maintenance.

Toward establishing a slow sand filtration plant, and for each and every purpose connected therewith, including the preparation of plans, and for the purchase of such scientific books and periodicals as may be approved by the Secretary of War, five hundred thousand dollars, to be available immediately and until expended.

Filtration plant.

## INCREASING THE WATER SUPPLY.

For completion of Washington Aqueduct tunnel and Howard University reservoir, one hundred and sixty-two thousand two hundred and twenty-two dollars and ninety-seven cents.

Washington Aqueduct tunnel and Howard University reservoir.

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Approved, March 1, 1901.

March 1, 1901.

**CHAP. 672.—An Act To extend the time granted to the Muscle Shoals Power Company by an Act approved March third, eighteen hundred and ninety-nine, within which to commence and complete the work authorized in said Act to be done by said company.**

Time extended to Muscle Shoals Power Company to complete canal, etc., at Muscle Shoals, Ala.
Vol. 30, p. 1351.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the time allowed the Muscle Shoals Power Company by section two of an Act entitled "An Act granting to the Muscle Shoals Power Company right to erect and construct canal and power stations at Muscle Shoals, Alabama," approved March third, eighteen hundred and ninety-nine, to commence and complete the work therein authorized to be done, be extended so that unless the work authorized to be done in said Act be commenced within two years and completed within four years from the date of this Act the privileges granted to said company by said first-mentioned Act shall cease and be determined.

Approved, March 1, 1901.

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March 1, 1901.

**CHAP. 673.—An Act To revive and amend an Act entitled "An Act to authorize the Pittsburg and Mansfield Railroad Company to construct and maintain a bridge across the Monongahela River."**

Time extended to Pittsburg and Mansfield Railroad to bridge Monongahela River.
Vol. 28, p. 702.
Vol. 30, p. 330.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.* That the Act entitled "An Act to authorize the Pittsburg and Mansfield Railroad Company to construct and maintain a bridge across the Monongahela River," approved March second, eighteen hundred and ninety-five, and amended by an Act approved March nineteenth, eighteen hundred and ninety-eight, is hereby revived, reenacted, and declared to be in full force and effect.

SEC. 2. That the said Act is hereby so amended as to extend the time for the completion of said bridge by said company, or its assigns, to March second, nineteen hundred and four.

Approved, March 1, 1901.

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March 1, 1901.

**CHAP. 674.—An Act Providing that entrymen under the homestead laws, who have served in the United States Army, Navy, or Marine Corps during the Spanish war or the Philippine insurrection, shall have certain service deducted from the time required to perfect title under homestead laws, and for other purposes.**

Soldiers' and sailors' homesteads.
R. S., secs. 2304, 2305, p. 422, amended.
Soldiers and sailors serving in war of rebellion.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That sections twenty-three hundred and four and twenty-three hundred and five of the Revised Statutes be, and the same are hereby, amended to read as follows:

"SEC. 2304. Every private soldier and officer who has served in the Army of the United States during the recent rebellion for ninety days, and who was honorably discharged and has remained loyal to the Government, including the troops mustered into the service of the United

Vol. 12, p. 339.

States by virtue of the third section of an Act approved February thirteenth, eighteen hundred and sixty-two, and every seaman, marine, and officer who has served in the Navy of the United States or in the Marine Corps during the rebellion for ninety days, and who was honorably discharged and has remained loyal to the Government, and every private soldier and officer who has served in the Army of the United States during the Spanish war, or who has served, is serving, or shall have served in the said Army during the suppression of the insurrection in the Philippines for ninety days, and who was or shall be honorably discharged; and every seaman, marine, and officer who has served in the Navy of the United States or in the Marine Corps during the Spanish war, or who has served, is serving, or shall have served in the said forces during the suppression of the insurrection in the Philippines for ninety days, and who was or shall be honorably discharged, shall, on compliance with the provisions of this chapter, as hereinafter modified, be entitled to enter upon and receive patents for a quantity of public lands not exceeding one hundred and sixty acres, or one quarter section, to be taken in compact form, according to legal subdivisions, including the alternate reserved sections of public lands along the line of any railroad or other public work not otherwise reserved or appropriated, and other lands subject to entry under the homestead laws of the United States; but such homestead settler shall be allowed six months after locating his homestead and filing his declaratory statement within which to make his entry and commence his settlement and improvement.

—during Spanish war.

—in Philippines.

—may enter public lands, etc.

—time to enter, etc.

Deduction of military or naval service from time required to perfect title, etc.

"SEC. 2305. The time which the homestead settler has served in the Army, Navy, or Marine Corps shall be deducted from the time heretofore required to perfect title, or if discharged on account of wounds received or disability incurred in the line of duty, then the term of enlistment shall be deducted from the time heretofore required to perfect title, without reference to the length of time he may have served; but no patent shall issue to any homestead settler who has not resided upon, improved, and cultivated his homestead for a period of at least one year after he shall have commenced his improvements:" *Provided*, That in every case in which a settler on the public land of the United States under the homestead laws died while actually engaged in the Army, Navy, or Marine Corps of the United States as private soldier, officer, seaman, or marine, during the war with Spain or the Philippine insurrection, his widow, if unmarried, or in case of her death or marriage, then his minor orphan children or his or their legal representatives, may proceed forthwith to make final proof upon the land so held by the deceased soldier and settler, and that the death of such soldier while so engaged in the service of the United States shall, in the administration of the homestead laws, be construed to be equivalent to a performance of all requirements as to residence and cultivation for the full period of five years, and shall entitle his widow, if unmarried, or in case of her death or marriage, then his minor orphan children or his

*Proviso.*
Final proof by heirs of deceased soldier, etc.

—legal effect of death.

or their legal representatives, to make final proof upon and receive Government patent for said land; and that upon proof produced to the officers of the proper local land office by the widow, if unmarried, or in case of her death or marriage, then his minor orphan children or his or their legal representatives, that the applicant for patent is the widow, if unmarried, or in case of her death or marriage, his orphan children or his or their legal representatives, and that such soldier, sailor, or marine died while in the service of the United States as hereinbefore described, the patent for such land shall issue.

Approved, March 1, 1901.

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March 1, 1901.

**CHAP. 677.—An Act Making appropriations for fortifications and other works of defense, for the armament thereof, for the procurement of heavy ordnance for trial and service, and for other purposes.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the sums of money herein provided for be, and the same are hereby, appropriated, out of any moneys in the Treasury not otherwise appropriated, to be available until expended, namely:

Fortifications appropriations.

Fortifications, etc.

FORTIFICATIONS AND OTHER WORKS OF DEFENSE.

Gun batteries.

For construction of gun batteries, one million six hundred and fifteen thousand dollars.

Search lights, New York Harbor.

For purchase and installation of search lights for the defenses of New York Harbor, one hundred and fifty thousand dollars.

Range, etc., finders.

For installation of range and position finders, one hundred and fifty thousand dollars.

Sites.

For the procurement of land, or right pertaining thereto, needed for the site, location, construction, or prosecution of works for fortifications and coast defenses, two hundred thousand dollars.

Repairs.

For the protection, preservation, and repair of fortifications for which there may be no special appropriation available, one hundred thousand dollars.

—Galveston.

For reconstruction and repair of the fortifications to protect the harbor of Galveston, Texas, and for each and every purpose necessary in connection therewith, nine hundred and ninety-two thousand dollars.

Plans.

For preparation of plans for fortifications, five thousand dollars.

Tools, etc.

For tools, electrical and engine supplies, to be furnished by the Engineer Department, for use of the troops for maintaining and operating electric light and power plants in gun and mortar batteries, twenty-five thousand dollars.

Sea walls.

For construction of sea walls and embankments, one hundred thousand dollars.

Submarine mines.

For the purchase of submarine mines and necessary appliances to operate them for closing the channels leading to our principal seaports, including San Juan, Porto

Rico; needful casemates, cable galleries, and so forth, to render it possible to operate submarine mines, and continuing torpedo experiments, fifty thousand dollars.

* * * * *

Purchases to be of American manufacture.

That all material purchased under the foregoing provisions of this Act shall be of American manufacture, except in cases when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases in limited quantities abroad, which material shall be admitted free of duty.

Approved, March 1, 1901.

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March 1, 1901.

**CHAP. 678.—An Act Authorizing Calhoun County, State of Texas, to construct and maintain a free bridge across Lavaca Bay.**

Calhoun County, Tex., may bridge Lavaca Bay.

—location.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the county of Calhoun, State of Texas, be, and is hereby, authorized to construct and maintain a free bridge across Lavaca Bay, in said State and county, at a point between Nobles Point on one side of said bay and Coxs Point on the other, for the passage of all legitimate traffic of foot, horse, vehicle, animal, and all other legitimate purposes, and for transmission of mails free of all rates of toll whatsoever.

Aids to navigation.

Lights.

SEC. 2. That the bridge herein authorized to be constructed shall be so kept and managed by said county as to afford proper ways and means for the passage through or under it of vessels, barges, or rafts at all times, both by day and night. and if the bridge be constructed as a drawbridge the draw shall be opened promptly upon reasonable signal for the passage of boats as the Light-House Board may prescribe.

Unobstructed navigation.

*Proviso.* Existing law unimpaired.

SEC. 3. That if said bridge erected and maintained under the authority of this Act shall at any time substantially or materially obstruct the free navigation of said bay, or shall in the opinion of the Secretary of War obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will effectually obviate such obstruction, and such alteration shall be made and all such obstruction be removed at the expense of said county, and in case of any litigation arising from obstruction or alleged obstruction to the free navigation of said bay the case may be brought in the district court of the United States having jurisdiction thereof: *Provided*, That nothing in this Act be so construed as to repeal or modify any of the provisions of law now existing in reference to the protection of the navigation of rivers and bays or to exempt said bridge from the operation of the same.

Secretary of War to approve plans.

SEC. 4. That the bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of said bay as the Secretary of War shall prescribe; and to secure that object the said county shall submit to the Secretary of War, for his examination and approval, a design and drawings of said bridge and a map of the location, prepared with reference to known datum plane upon prescribed scale, furnished by the engineer officer having supervision of said bay, and giving, for the space of two miles above and two miles below the proposed location of the bridge, the topography of the banks of the bay, with shore lines at high and low water, the direction and strength of the currents at all stages, and the soundings accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject. And until the said plans and location of the bridge are approved by the Secretary of War the bridge shall not be built; and should any change be made in the plan of the said bridge during the process of construction such change shall be subject to the approval of the Secretary of War.

Lawful structure and post route.

SEC. 5. That the bridge constructed, maintained, and operated under this Act and according to its limitations shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transportation over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions over the railroads and public highways leading to said bridge; and the United States shall have the right of way for postal, telegraph, and telephone purposes over said bridge.

Commencement and completion.

SEC. 6. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date hereof.

Amendment.

SEC. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 1, 1901.

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March 2, 1901.

**CHAP. 803.**—An Act Making appropriation for the support of the Army for the fiscal year ending June thirtieth, nineteen hundred and two.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Army appropriations.

That the following sums be, and they are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the year ending June thirtieth, nineteen hundred and two:

* * * * *

MISCELLANEOUS.

* * * * *

Additional pay, officer in charge of public buildings, District of Columbia.

For additional pay to officer in charge of public buildings and grounds at Washington, District of Columbia, one thousand dollars.

* * * * *

For mileage to officers and contract surgeons, when authorized by law, five hundred thousand dollars: *Provided*, That hereafter officers so traveling shall be paid seven cents per mile and no more; distances to be computed and mileage to be paid over the shortest usually traveled routes, with deduction as hereinafter provided; and payment and settlement of mileage accounts of officers shall be made according to distances and deductions computed over routes established and by mileage tables prepared by the Paymaster-General of the Army under the direction of the Secretary of War; and all payments made by paymasters on account of mileage previous to the passage of this Act shall be settled in accordance with distance tables officially promulgated and in use at date of payment. The Secretary of War may determine what shall constitute travel and duty "without troops" within the meaning of the laws governing the payment of mileage and commutation of quarters to officers of the Army: *Provided further*, That officers who so desire may, upon application to the Quartermaster's Department, be furnished with transportation requests, exclusive of sleeping and parlor car accommodations, for the entire journey under their orders; and the transportation so furnished shall be a charge against the officer's mileage account, to be deducted at the rate of three cents per mile by the paymaster paying the account, and of the amount so deducted there shall be turned over to an authorized officer of the Quartermaster's Department three cents per mile for transportation furnished over any railroad which is not a free, bond-aided, or fifty per centum land-grant railroad for the credit of the appropriation for transportation of the Army and its supplies: *And provided further*, That when the established route of travel shall, in whole or in part, be over the line of any railroad on which the troops and supplies of the United States are entitled to be transported free of charge, or over any of the bond-aided Pacific railroads, or over any fifty per centum land-grant railroad, officers traveling as herein provided for shall, for the travel over such roads, be furnished with transportation requests, exclusive of sleeping and parlor car accommodations, by the Quartermaster's Department: *And provided further*, That when transportation is furnished by the Quartermaster's Department, or when the established route of travel is over any of the railroads above specified, there shall be deducted from the officer's mileage account by the paymaster paying the same three cents per mile for the distance for which transportation has been or should have been furnished: *And provided further*, That officers of the Army and acting assistant surgeons who, by reason of failure to obtain transportation requests for travel over so-called "Agreement railroads," have, in addition to paying their own fare over such railroads, been required by the accounting officers of the Treasury to refund to the United States one-half of the cost of travel fare over such railroads, shall be reimbursed by the proper accounting

Mileage to officers.

*Provisos.*
—limit.

Settlement of mileage accounts.

Travel "without troops;" what constitutes, etc.

Transportation requests.

Travel on bond-aided, etc., railroads, etc.

—deduction.

—reimbursement to officers traveling without transportation requests for certain refunds to United States.

—credit to paymasters.

officers the amount so refunded; and paymasters against whom disallowances have been made by the accounting officers on account of failure to deduct the cost of travel fare over such railroads shall have the amount so disallowed passed to their credit:

—reimbursement to officers for transportation not furnished, etc.

*And provided further*, That in all cases where three cents per mile has been deducted from the mileage accounts of officers of the Army or acting assistant surgeons on account of transportation which should have been but was not furnished such officers and acting assistant surgeons shall be reimbursed by the proper accounting officers an amount equal to what it would have cost the Government if transportation had been furnished: *And provided further*, That actual expenses only shall be paid to officers for sea travel when traveling, as herein provided for, to, from, or between our island possessions:

Leaves of absence to officers, foreign service, when to commence, etc.

*Provided*, That leaves of absence which may be granted officers of the Regular or Volunteer Army serving in the Territory of Alaska or without the limits of the United States, for the purpose of returning thereto, or which may have been granted such officers for such purpose since the thirteenth day of October, eighteen hundred and ninety-eight, shall be regarded as taking effect on the dates such officers reached or may have reached the United States, respectively, and as terminating, or as having terminated, on the respective dates of their departure from the United States in returning to their commands, as authorized by an order of the Secretary of War dated October thirteenth, eighteen hundred and ninety-eight:

Travel allowance on discharge.
—officers.

*Provided also*, That hereafter when an officer shall be discharged from the service, except by way of punishment for an offense, he shall receive for travel allowances from the place of his discharge to the place of his residence at the time of his appointment or to the place of his original muster into the service four cents per mile;

—enlisted men.

and an enlisted man when discharged from the service, except by way of punishment for an offense, shall receive four cents per mile from the place of his discharge to the place of his enlistment, enrollment, or original muster into the service:

—reentering service in Philippines.

*Provided further*, That any officer or enlisted man in the service of the United States who was discharged in the Philippine Islands and there reentered the service through commission or enlistment shall, when discharged, except by way of punishment for an offense, receive for travel allowances from the place of his discharge to the place in the United States of his last preceding appointment or enlistment, or to his home if he was appointed or enlisted at a place other than his home, four cents per mile:

--sea travel.

*Provided further*, That for sea travel on discharge actual expenses only shall be paid to officers and transportation and subsistence only shall be furnished to enlisted men.

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Accounting.

All the money hereinbefore appropriated, except the appropriation for mileage of officers when authorized by law shall be disbursed and accounted for by the Pay

Department as pay of the Army, and for that purpose shall constitute one fund.

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### ENGINEER DEPARTMENT.

Engineer Department.

Incidental expenses.

ENGINEER DEPOT AT WILLETS POINT, NEW YORK: For incidental expenses of the depot, including fuel, lights, chemicals, stationery, hardware, extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers, repairs of, and for materials to repair, public buildings, machinery, and unforeseen expenses, five thousand dollars.

Materials.

For the purchase of material for use of United States Engineer School and for instruction of engineer troops at Fort Totten, Willets Point, in their special duties as sappers and miners; for land and submarine mines, pontoniers, torpedo drill, and signaling, and for travel expenses of officers on journeys approved by the Chief of Engineers and made for the purpose of instruction, one thousand five hundred dollars: *Provided*, That the traveling expenses herein provided for shall be in lieu of mileage or other allowances.

Instruments.

For purchase and repair of instruments, to be issued to officers of the Corps of Engineers and to officers detailed and on duty as acting engineer officers, for use on public works and surveys, three thousand dollars.

Library.

For purchase and binding of professional works of recent date treating of military and civil engineering and kindred scientific subjects, for library of the United States Engineering School, five hundred dollars.

Addition to building.

Addition to the building containing the collection of engineering models used for illustration and instruction, and the library of the United States Engineer School, to be available until expended, twelve thousand dollars.

Tools, etc.

For pontoon trains, intrenching tools, instruments, and drawing materials, twenty thousand dollars.

Surveyors, etc.

For services of surveyors, draftsmen, photographers, master laborers, clerks to engineer officers on the staff of division, corps, and department commanders, twenty-five thousand dollars.

Total for Engineer Department, sixty-seven thousand dollars.

* * * * *

Time extended to War Department to examine monthly accounts of Army expenditures.
Vol. 28, p. 209.

The time for examination of monthly accounts, covering expenditures from appropriations for the Army, by the bureaus and offices of the War Department, after the date of actual receipt and before transmitting the same to the Auditor for the War Department, as limited by section twelve, Act approved July thirty-first, eighteen hundred and ninety-four, is hereby extended from twenty to sixty days.

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Repeal.

All laws or parts of laws inconsistent with the provisions of this Act are hereby repealed.

Approved, March 2, 1901.

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March 2, 1901.

**CHAP. 804.—An Act Making appropriations for the support of the Military Academy for the fiscal year ending June thirtieth, nineteen hundred and two, and for other purposes.**

Military Academy appropriations.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Military Academy for the fiscal year ending June thirtieth, nineteen hundred and two.

Permanent establishment.

PERMANENT ESTABLISHMENT.

* * * * *

Extra to officers.

For extra pay of officers of the Army on detached service at the Military Academy:

* * * * *

For pay of one instructor of practical military engineering (major), in addition to pay as captain, mounted, five hundred dollars;

* * * * *

For pay of five senior instructors of cavalry, artillery, and infantry tactics, ordnance and gunnery, and practical military engineering (captains), in addition to pay as first lieutenants, not mounted, two thousand five hundred dollars;

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Approved, March 2, 1901.

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March 2, 1901.

**CHAP. 809.—An Act To prevent the failure of military justice, and for other purposes.**

Army.
Refusal to qualify as witness before courts-martial.

—penalty.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That every person not belonging to the Army of the United States who, being duly subpœnaed to appear as a witness before a general court-martial of the Army, willfully neglects or refuses to appear, or refuses to qualify as a witness or to testify or produce documentary evidence which such person may have been legally subpœnaed to produce, shall be deemed guilty of a misdemeanor, for which such person shall be punished on information in the

—proceedings against.

*Proviso* —exceptions.

—witness fees to be tendered.

*Proviso.* Self-incrimination not compelled.

district court of the United States; and it shall be the duty of the United States district attorney, on the certification of the facts to him by the general court-martial, to file an information against and prosecute the person so offending, and the punishment of such person, on conviction, shall be a fine of not more than five hundred dollars or imprisonment not to exceed six months, or both, at the discretion of the court: *Provided*, That this shall not apply to persons residing beyond the State, Territory, or District in which such general court-martial is held, and that the fees of such witness, and his mileage at the rates provided for witnesses in the United States district court for said State, Territory or District shall be duly paid or tendered said witness, such amounts to be paid by the Pay Department of the Army out of the appropriation for compensation of witnesses: *Provided*, That no witness shall be compelled to incriminate himself or to answer any questions which may tend to incriminate or degrade him.

Hours of sitting. R. S., sec. 1342, p. 239, repealed.

SEC. 2. That article ninety-four, section thirteen hundred and forty-two, of the Revised Statutes of the United States be, and the same is hereby, repealed.

Army officers may administer oaths. R. S., sec. 183, p. 29, amended.

SEC. 3. That section one hundred and eighty-three of the Revised Statutes of the United States be, and the same is hereby, amended so as to read as follows:

"SEC. 183. Any officer or clerk of any of the departments lawfully detailed to investigate frauds on, or attempts to defraud, the Government, or any irregularity or misconduct of any officer or agent of the United States, and any officer of the Army detailed to conduct an investigation, and the recorder, and, if there be none, the presiding officer of any military board appointed for such purpose, shall have authority to administer an oath to any witness attending to testify or depose in the course of such investigation."

SEC. 4. That article eighty-three, section thirteen hundred and forty-two, of the Revised Statutes of the United States be, and the same is hereby, amended to read as follows:

Jurisdiction of courts-martial. R. S., sec. 1342, p. 238, amended.

*Proviso.* Trial by summary court with consent, etc.

"ARTICLE 83. Regimental and garrison courts-martial and summary courts detailed under existing laws to try enlisted men shall not have power to try capital cases or commissioned officers, but shall have power to award punishment not to exceed confinement at hard labor for three months or forfeiture of three months' pay, or both, and in addition thereto, in the case of noncommissioned officers reduction to the ranks and in the case of first-class privates reduction to second-class privates: *Provided*, That a summary court shall not adjudge confinement and forfeiture in excess of a period of one month, unless the accused shall before trial consent in writing to trial by said court, but in any case of refusal to so consent, the trial may be had either by general, regimental, or garrison court-martial, or by said summary court, but in case of trial by said summary court without consent as aforesaid, the court shall not adjudge confinement or forfeiture of pay for more than one month."

Penalty for certain frauds against the United States.
R. S., sec. 1342, p. 236.

SEC. 5. That article sixty, section thirteen hundred and forty-two, of the Revised Statutes of the United States be, and the same is hereby, amended by inserting after the words "shall, on conviction thereof, be punished by fine or imprisonment, or by such other punishment as a court-martial may adjudge," the words "or by any or all of said penalties."

Approved, March 2, 1901.

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March 2, 1901.

**CHAP. 813.—An Act Authorizing the Citizens' Bridge Company to construct a bridge across the Mississippi River.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,*

Citizens' Bridge Company may bridge Mississippi River at Burlington, Iowa.

Tracks.

Unobstructed navigation.

That the Citizens' Bridge Company, a corporation of that name organized under the laws of the State of Iowa, and having its principal place of business at Burlington, Iowa, its successors and assigns be, and they are hereby, authorized to construct and maintain a railroad, wagon, and foot-passenger bridge across the Mississippi River at a place suitable to the interests of navigation at a point at or near the city of Burlington, Iowa, and to lay on or over said bridge a track or tracks for the more perfect connection of any railroad or railroads that are or shall be constructed to the said river, on either or both sides thereof, at or opposite said point, under the limitations and conditions hereinafter provided. The said bridge shall not unreasonably interfere with the free navigation of said river and in case of any litigation arising from any obstruction or alleged obstruction to the free navigation of said river, the cause may be tried before the circuit court of the United States in and for any district in whose jurisdiction any portion of said bridge or obstruction may be.

Transit of wagons, etc.

*Proviso.*
—qualification.

Said bridge shall be constructed to provide for the passage of railroad trains, and for the safe and convenient passage of wagons and vehicles of all kinds, animals, and foot passengers, for such reasonable rates of toll as may be fixed from time to time by the Secretary of War: *Provided*, That the proviso regarding wagons, animals, foot passengers, and so forth, shall not affect the location of said bridge in its relation to the interests of navigation.

Draw.

*Provisos.*
Spans, etc.

Pivot draw-bridge.

SEC. 2. That any bridge built under the provisions of this Act may, at the option of the company building the same, be built as a drawbridge or with unbroken and continuous spans: *Provided*, That if the said bridge shall be made with unbroken and continuous spans, it shall have one or more channel spans, each having not less than three hundred and fifty feet clear channel way and not less than fifty-five feet clear headroom above high-water mark, and the clear head room under other than channel spans may be less than fifty-five feet: *Provided*, That no part of the superstructure of such spans shall give a less headroom than ten feet above high-water mark: *And provided further*, That the interests of navigation be not injured by such reduction in height: *And provided further*, That if any bridge built under the provisions of this

Act shall be constructed as a drawbridge, the same shall be constructed as a pivot drawbridge, which shall have two or more draw openings, each having not less than two hundred feet clear channel way, and in addition to said draw openings shall have one or more fixed channel spans, each having not less than three hundred and fifty feet clear channel way; and every part of the superstructure of said low bridge shall give a clear headroom of not less than ten feet above high-water mark: *Provided*, That all spans of both high and low bridges shall be so located as to afford the greatest possible accommodations to the river traffic, and a draw opening of the low bridge shall, if practicable, be located next or near the shore: *Provided, also*, That in case of a low bridge, if the physical characteristics of the locality so require and the interests of navigation be not injured thereby, the lengths of the fixed spans or the number of the draw openings may be reduced: *Provided, also*, That for any two adjacent draw openings of two hundred feet one draw opening of three hundred feet may be substituted, if the interests of navigation be not injured thereby; and the piers of said bridge shall be parallel with the current of the river where said bridge shall be erected, and the bridge itself at right angles thereto: *Provided, also*, That said bridge shall be opened promptly, upon reasonable signal, for the passage of boats, except when trains are passing over the draw; but in no case shall unnecessary delay occur in opening the said draw during or after the passage of trains.

Aids to navigation.

Reducing draw openings, etc.

Piers, etc.

Opening draw.

SEC. 3. That any bridge constructed under this Act and according to its limitations shall be a lawful structure and shall be known as a post route, and the same is hereby declared to be a post route, upon which also no higher charge shall be made for transmission over the same of the mails, the troops, and the munitions of war of the United States, and for passengers and freight passing over said bridge, than the rate per mile paid for their transportation over the railroads and public highways leading to the bridge; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way for postal-telegraph purposes across said bridge.

Lawful structure and post route.

Telegraph, etc., companies.

SEC. 4. That all railroad companies desiring to use said bridge shall have and be entitled to equal rights and privileges in the passage of the same, and in the use of the machinery and fixtures thereof, and of all the approaches thereto, under and upon such terms and conditions as shall be prescribed by the Secretary of War, upon hearing the allegations and proofs of the parties, in case they shall not agree.

Rights of railroads to use.

SEC. 5. That the structure herein authorized shall be built and located under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe; and to secure that object the said company or corporation shall submit to the Secretary of War, for his examination and approval, a design and drawing of the bridge and a map of the location, giving,

Secretary of War to approve plans.

for the space of one mile above and one mile below the proposed location, the topography of the banks of the river, the shore line at high and low water, the direction and strength of the current at all stages, and the soundings, accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as shall be required for a full and satisfactory understanding of the subject; and until the said plan and location of the bridge are decided by the Secretary of War to be such as will not materially affect the interest of navigation, the bridge shall not be commenced or built; and should any change be made in plan of said bridge during the progress of construction, or after completion, such change shall be subject to the approval of the Secretary of War; and said bridge shall be constructed with such aids to the passage of said bridge, in the form of booms, dikes, piers, or other suitable and proper structures for confining the flow of water to a permanent and easily navigated channel, for a distance of not less than one mile above the bridge location, and for the guiding of rafts, steamboats, and other water craft safely through the draw and raft spans, as the Secretary of War shall prescribe and order to be constructed and maintained at the expense of the company owning said bridge; and the said bridge shall be at all times so kept and managed as to offer reasonable and proper means for the passage of vessels through or under said structure: and for the safety of vessels passing at night there shall be displayed on said bridge, from the hours of sunset to sunrise, such lights as may be prescribed by the Light-House Board; and the said structure shall be changed at the cost and expense of the owners thereof, from time to time, as the Secretary of War may direct, so as to preserve the free and convenient navigation of said river; and the authority to erect and continue said bridge shall be subject to revocation and modification when the public good, in the judgment of the Secretary of War, so requires, without any expense or charge to the United States.

Lights.

Alterations.

Commencement and completion.

SEC. 6. That if actual construction of the bridge herein authorized shall not be commenced within one year from the passage of this Act and be completed in three years from the same date, the rights and privileges hereby granted shall cease and be determined.

Amendment.

SEC. 7. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 2, 1901.

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March 2, 1901.

**CHAP. 816.**—An Act To revive and amend an Act entitled "An Act to authorize the Georgia Pine Railway of Georgia to construct a bridge across the Flint River, a navigable stream, in Decatur County, Georgia."

Time extended to Georgia Pine Railway to bridge Flint River, Georgia.
Vol. 30, p. 966.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That an Act to authorize the Georgia Pine Railway of Georgia to construct a bridge across the Flint River, a navigable stream, in Decatur County, Georgia, approved

March first, eighteen hundred and ninety-nine, be, and the same is hereby, revived, reenacted, and declared to be in full force and effect.

SEC. 2. That section six of said Act is hereby amended to read as follows:

"SEC. 6. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from March first, nineteen hundred and one."

Approved, March 2, 1901.

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**CHAP. 817.**—An Act Authorizing the construction of a bridge across the Cumberland River at or near Carthage, Tennessee.

March 2, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the town of Carthage, a municipal corporation in the State of Tennessee, organized under the laws of said State, either singly or in conjunction with the county of Smith, in the said State, upon such terms as may be agreed upon, be, and is hereby, authorized and empowered to construct, maintain, and operate a bridge across the Cumberland River at or near the town of Carthage at such point as, in the judgment of the Secretary of War, may be suitable to the interests of navigation.

Carthage, Tenn., may bridge Cumberland River at Carthage.

SEC. 2. That the bridge built under this Act and subject to its limitations may be a drawbridge or of fixed span or spans, but in any event shall be a lawful structure, and shall be known and recognized as a post route, upon which also no higher charge shall be made for the transportation over the same of the mails, the troops, and munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions over the railroads and public highways leading to said bridge; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way over said bridge and its approaches for postal telegraph and telephone purposes. That the bridge authorized to be constructed under this Act shall be built and located subject to such regulations for the security of navigation of said river and the passage of vessels and other floating craft under said bridge as the Secretary of War shall prescribe; and to secure that object the said town of Carthage shall submit to the Secretary of War, for his examination and approval, a design and drawing of said bridge, with a map of the location thereof, and shall furnish such other information as may be required for the full and satisfactory understanding of the subject, and said bridge shall not be built until the plans and location thereof shall be approved by the Secretary of War; and should any change be made in the plans of said bridge during the progress of its construction, or after its completion, such change shall be subject to the approval of the Secretary of War: *Provided,* That if said bridge is constructed as a drawbridge the draw thereof shall be opened promptly

Lawful structure and post route.

Telegraph, etc., companies.

Secretary of War to approve plans.

*Proviso.*
Draw.

upon reasonable signal for the passage of boats, and the said municipality shall maintain thereon, at its own expense, between sunset and sunrise, such lights and other signals as the Light-House Board may prescribe. Lights.

Transit. Tolls. SEC. 3. That said bridge shall be constructed to provide for the passage of wagons, horsemen, and vehicles, for the transit of animals, and for foot passengers for such reasonable tolls as may be approved from time to time by the Secretary of War: *Provided also*, That at the option of said town of Carthage said bridge may be so constructed as to permit railroad, street car, or dummy lines to pass over said bridge upon such terms as may be or might be agreed upon between the said town of Carthage and any company or corporation operating any such line or lines, all such companies or corporations desiring to use said bridge to have equal rights and privileges relative thereto. *Proviso.* Railroad, rights to use.

Amendment. SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Commencement and completion. SEC. 5. That this Act shall be null and void if said bridge is not commenced within one year and completed within three years from the date of approval of this Act.

Approved, March 2, 1901.

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March 2, 1901.

**CHAP. 818.—An Act To authorize the construction of a bridge across Pearl River at Monticello, Mississippi.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the board of supervisors of Lawrence County, in the State of Mississippi, be, and is hereby, authorized to construct and maintain a bridge, and approaches thereto, across the Pearl River at or near the town of Monticello, in said county and State. Said bridge shall be constructed to provide for the passage of wagons and vehicles of all kinds, animals, foot passengers, and for all road travel, charging and receiving therefor, at the option of said board of supervisors, such reasonable rates of toll and under such reasonable rules and regulations as may be prescribed by said board of supervisors and approved from time to time by the Secretary of War. Lawrence County, Miss., may bridge Pearl River at Monticello. Toll, etc.

Lawful structure and post route. SEC. 2. That said bridge, built under this Act and subject to its limitations, shall be a lawful structure, and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and munitions of war of the United States than the rate paid for the transmission over the public highways leading to the said bridge, and shall enjoy the rights and privileges of other post roads in the United States, and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridge and its approaches for postal-telegraph purposes. Said bridge Telegraph, etc., companies.

shall contain a draw span giving a clear opening of a width to be determined by the Secretary of War, which draw span shall be maintained over the main channel of the river at an accessible and navigable point, and that said draw shall be opened promptly, upon reasonable signal, for the passage of boats and rafts; and said board of supervisors shall maintain at its own expense, from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe.

**Draw.**

**Lights.**

**Unobstructed navigation.**

SEC. 3. That no bridge shall be erected or maintained under the authority of this Act which shall at any time unreasonably obstruct the free navigation of said river; and if any bridge erected under such authority shall, in the opinion of the Secretary of War, unreasonably obstruct navigation he is hereby authorized to cause the entire removal thereof, or such changes or alterations of said bridge to be made as will obviate such obstruction; and all such alterations shall be made and all such obstructions shall be removed at the expense of the owner or owners of said bridge; and in case of any litigation arising from any obstructions or alleged obstructions to the free navigation of said river, caused or alleged to be caused by said bridge, the case may be brought in the district court of the United States of the State of Mississippi in whose jurisdiction any portion of said obstruction or bridge may be located: *Provided*, That nothing in this Act shall be so construed as to repeal or modify any of the provisions of the law now existing in reference to the protection of the navigation of rivers or to exempt this bridge from the operation of same.

**—litigation.**

*Proviso.*
**Existing law unaffected.**

**Secretary of War to approve plans.**

SEC. 4. That any bridge authorized to be constructed under this Act shall be built and located under and subject to such regulations for the security of navigation of the said river as the Secretary of War shall prescribe; and to secure that object the said board of supervisors shall submit to the Secretary of War, for his examination and approval, a design and drawing of the bridge, and a map of the location, giving, for the space of one-half mile above and one-half mile below the proposed location, the high and low water lines upon the banks of the river, the direction and strength of the currents at low and at high water, with the soundings accurately showing the bed of the stream, and the location of any other bridge or bridges, such map to be sufficiently in detail to enable the Secretary of War to judge of the proper location of said bridge, and shall furnish such other information as shall be required for a full and satisfactory understanding of the subject; and until the said plan and location of the bridge are approved by the Secretary of War the bridge shall not be commenced or built; and should any change be made in the plans of said bridge during the progress of its construction, or after completion, such changes shall be subject to the approval of the Secretary of War.

**Commencement and completion.**

SEC. 5. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from the date of the approval hereof.

Amendment.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 2, 1901.

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March 3, 1901.

**CHAP. 830.—An Act Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and two, and for other purposes.**

Legislative, executive, and judicial expenses, appropriations.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, in full compensation for the service of the fiscal year ending June thirtieth, nineteen hundred and two, for the objects hereinafter expressed, namely:

* * * * *

War Department.

## WAR DEPARTMENT.

* * * * *

Office Chief of Engineers.

OFFICE OF THE CHIEF OF ENGINEERS: For chief clerk, two thousand dollars; five clerks of class four; four clerks of class three; four clerks of class two; four clerks of class one; one clerk, one thousand dollars; one assistant messenger, and two laborers; in all, thirty thousand eight hundred and forty dollars.

Skilled draftsmen.

Proviso.—limit expenditures.

And the services of skilled draftsmen, civil engineers, and such other services as the Secretary of War may deem necessary may be employed in the office of the Chief of Engineers to carry into effect the various appropriations for rivers and harbors, fortifications, and surveys to be paid from such appropriations: *Provided*, That the expenditures on this account for the fiscal year ending June thirtieth, nineteen hundred and two, shall not exceed seventy-two thousand dollars; and that the Secretary of War shall each year, in the annual estimates, report to Congress the number of persons so employed and the amount paid to each.

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Public buildings and grounds.

## PUBLIC BUILDINGS AND GROUNDS.

Clerks, etc.

OFFICE OF PUBLIC BUILDINGS AND GROUNDS: For one assistant engineer, one thousand eight hundred dollars; one office clerk, one thousand eight hundred dollars; one clerk, one thousand six hundred dollars; one messenger; landscape gardener, two thousand dollars; one surveyor and draftsman, one thousand five hundred dollars; in all, nine thousand five hundred and forty dollars.

Overseers and watchmen.

For overseers, draftsmen, foremen, gardeners, mechanics, and laborers employed in the public grounds, thirty-five thousand dollars.

For one sergeant of park watchmen, nine hundred dollars.

For day watchmen as follows: One in Franklin Park; one in Lafayette Park; two in Smithsonian Grounds; one in Judiciary Park; one in Lincoln Park and adjacent reservations; one at Iowa Circle; one at Thomas Circle and neighboring reservations; one at Washington Circle and neighboring reservations; one at Dupont Circle and neighboring reservations; one at McPherson and Farragut parks; one at Stanton Park and neighboring reservations; two at Henry and Seaton parks; one at Mount Vernon Park and adjacent reservations; one for the greenhouses and nursery; two at grounds south of Executive Mansion; one at Garfield Park; one at Monument Park; twenty in all, at seven hundred and twenty dollars each, fourteen thousand four hundred dollars.

For night watchmen as follows: Two in Smithsonian Grounds; one in Judiciary Park; two in Henry and Seaton parks; one in grounds south of Executive Mansion; one in Monument Park; and two in Garfield Park; nine in all, at seven hundred and twenty dollars each, six thousand four hundred and eighty dollars.

Wakefield, Va.

For watchman for the care of the monument and dock at Wakefield, Virginia, the birthplace of Washington, three hundred dollars.

Contingent expenses.

For contingent and incidental expenses, including purchase of professional and scientific books and periodicals, books of reference, blank books, photographs, and maps, six hundred dollars.

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Appropriations not available for incapacitated employees.

SEC. 4. That the appropriations herein made for the officers, clerks, and persons employed in the public service shall not be available for the compensation of any persons permanently incapacitated for performing such service.

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Repeal.

SEC. 6. That all laws or parts of laws inconsistent with this Act are repealed.

Approved, March 3, 1901.

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March 3, 1901.

**CHAP. 831.—An Act Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and one, and for prior years, and for other purposes.**

Deficiencies appropriations.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in the appropriations for the fiscal year nineteen hundred and one, and for prior years, and for other objects hereinafter stated, namely:

* * * * *

Department of State.

## DEPARTMENT OF STATE.

* * * * *

Isthmian Canal Commission. Appropriation for expenses. Vol. 30, p. 1150.

ISTHMIAN CANAL COMMISSION: To defray the expenses necessarily incurred in making the investigation authorized by sections three and four of the river and harbor appropriation Act approved March third, eighteen hundred and ninety-nine, seventy-five thousand dollars.

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Treasury Department.

## TREASURY DEPARTMENT.

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Credit in accounts of certain engineer officers.

CREDIT IN ACCOUNTS OF CERTAIN OFFICERS CORPS OF ENGINEERS: Authority is hereby granted to the accounting officers of the Treasury to allow and credit in the accounts of certain officers of the Corps of Engineers, United States Army, amounts standing against them on the books of the Treasury as follows: Captain W. E. Craighill, twenty-seven dollars and twenty-three cents; Major E. H. Ruffner, eighty-three dollars; Major W. L. Fisk, one hundred and sixteen dollars and fifteen cents; in all, two hundred and twenty-six dollars and thirty-eight cents.

* * * * *

District of Columbia.

## DISTRICT OF COLUMBIA.

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Aqueduct Bridge. Temporary protection authorized.

That of the unexpended balance of the appropriation for repairs to the Aqueduct Bridge, District of Columbia, the sum of one thousand four hundred and sixty-five dollars may be used under the direction of the Secretary of War for the temporary protection of said bridge.

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Claims allowed by the Auditor for the War Department.

## CLAIMS ALLOWED BY THE AUDITOR FOR THE WAR DEPARTMENT.

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For operating snagboats on the Ohio River, twenty-two cents.

For expenses California Débris Commission, four dollars and thirty-seven cents.

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Approved, March 3, 1901.

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March 3, 1901.

**CHAP. 839.—An Act To extend the time for the completion of a bridge across the Missouri River.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That section six of the Act approved March third, eighteen hundred and ninety-nine, authorizing the Dakota Southern Railroad Company to construct a combined railroad, wagon, and foot-passenger bridge across the Missouri River, at the city of Yankton, South Dakota, be, and is hereby, amended by extending the time for com-

Time extended to Dakota Southern Railroad to bridge Missouri River at Yankton, S. Dak. Vol. 30, p. 1360.

mencing the construction of said bridge to March third, nineteen hundred and two, and by extending the time for completing said bridge to March third, nineteen hundred and four.

Approved, March 3, 1901.

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March 3, 1901.

**CHAP. 840.—An Act To authorize the Montgomery and Autauga Bridge Company to construct a bridge across the Alabama River near the city of Montgomery, Alabama.**

**Montgomery and Autauga Bridge Company may bridge Alabama River at Montgomery, Ala.**

**Transit, etc.**

***Proviso.* Lawful structure and post route.**

**Postal telegraph, etc.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Montgomery and Autauga Bridge Company, a corporation created and existing under the general laws of the State of Alabama for the purpose of constructing and maintaining the bridge hereinafter mentioned, is hereby authorized to construct and maintain a street-car railway bridge, and the approaches thereto, over and across the Alabama River, in Alabama, at such point as may be selected by them between the city wharf at Montgomery, Alabama, and the bridge of the Louisville and Nashville Railroad Company, subject to approval by the Secretary of War. Said bridge shall be constructed to provide for the passage of electric street cars, and may be used for the passage of wagons and vehicles of all kinds, for transit of animals, and for foot passengers; such bridge to be so constructed as not to obstruct the navigation of said river and to be provided with a suitable draw: *Provided*, That any bridge constructed under this Act and according to its limits shall be a lawful structure, and shall be known and recognized as a post route, upon which also no higher charge shall be made for the transportation over the same of the mails, the troops, and the munitions of war of the United States than the rate per mile paid for transportation of said mails, troops, and munitions over the railroads and public highways leading to said bridge; and the United States shall have the right of way for postal, telegraph, and telephone purposes over said bridge.

**Secretary of War to approve plans, etc.**

SEC. 2. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe, and to secure that object the said Montgomery and Autauga Bridge Company shall submit to the Secretary of War, for his examination and approval, a design and drawing of the proposed bridge and a map of the location, giving for space of one-fourth mile above and one-fourth mile below the proposed location the topography of the banks of the river, the shore lines at high and low water, and the direction and strength of the currents, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject, and until the said plan and location of the bridge are approved by the Secretary of War no work upon the bridge shall be commenced; and should any change be made in the plan of said bridge during the progress of construction, or after completion, such change shall be subject to the approval of the Secretary of War.

Amendment.

Alterations.

SEC. 3. That Congress reserves the right to alter, amend, or repeal this Act at any time, and that if at any time navigation of said river shall in any manner be obstructed or impaired by the said bridge the Secretary of War shall have authority, and it shall be his duty, to require the said Montgomery and Autauga Bridge Company to alter and change the said bridge, at their own expense, in such manner as may be proper to secure free and complete navigation without impediment.

Draw.

Lights.

SEC. 4. That the draw provided for the bridge herein authorized to be constructed shall be opened promptly upon reasonable signal for the passing of boats; and said Montgomery and Autauga Bridge Company shall maintain at its own expense, from sunset to sunrise, such lights or other signals on said bridge as the Light-House Board shall prescribe.

Use by street railways.

Telephone, etc., companies.

Commencement and completion.

SEC. 5. That all street-railway companies desiring to use said bridge shall be allowed to do so upon paying a reasonable compensation for such use, and all telephone and telegraph companies shall be granted equal rights and privileges in the construction and operation of their lines across said bridge; and if actual construction of the bridge herein authorized shall not be commenced within one year and be completed within three years from same date the rights and privileges hereby granted shall cease and be determined.

Amendment.

SEC. 6. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 3, 1901.

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March 3, 1901.

**CHAP. 842.—An Act Authorizing the Texas and Pacific Railway Company to construct a bridge across Red River, Louisiana.**

Texas and Pacific Railway may bridge Red River at Turnbulls Island, La.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Texas and Pacific Railway Company is hereby authorized and empowered to construct and maintain a bridge across the Red River, Louisiana, at a point suitable to the interests of navigation at or near Turnbulls Island, so as to connect its lines south of Red River with proposed lines on the opposite or north bank of said river.

Aids to navigation.

Lights.

SEC. 2. That said bridge shall be so constructed that a reasonable, free, and unobstructed passageway may be secured and maintained by proper draws to all water craft navigating said river at the point aforesaid, and that said draw or draws shall be opened promptly upon reasonable signal for the passage of boats and vessels. The owners thereof shall maintain at their own expense from sunset to sunrise such lights or other signals thereon as the Light-House Board shall prescribe.

Secretary of War to approve plans, etc.

SEC. 3. That said bridge shall not be built or commenced until the plans and location of the same shall have been submitted to and approved by the Secretary of War; that no change shall be made in this construction, and no alteration of it after its construction, unless such change or alterations shall in like manner receive the approval of the Secretary of War: *Provided*, That if said bridge shall at any time, substantially or materially, obstruct the free navigation of said river, or shall, in the opinion of the Secretary of War, obstruct such navigation, he is hereby authorized to cause such change or alteration of said bridge to be made as will effectually obviate such obstruction; and such alteration shall be made and all such obstructions be removed at the expense of the owner or owners of said bridge.

—changes.

SEC. 4. That the Secretary of War upon receiving the designs, drawings, and specifications of said bridge, and a map of the location, and such other information as he may call for, and upon being satisfied that the bridge, when built according to such designs and drawings, will be in accordance with the requirements of this Act and will not unreasonably obstruct the navigation of said river, be, and is hereby, authorized and directed to approve said designs, drawings, and specifications, and to so notify the said railway company, and upon receipt of such notification the said railway company may proceed to construct said bridge, conforming strictly to the approved designs, drawings, and specifications.

—notification of approval, etc.

SEC. 5. This Act shall be null and void if the actual construction of the bridge herein authorized be not commenced within one year from the date of approval of this Act, and so forth, and completed within three years from the date thereafter.

Commencement and completion.

SEC. 6. That said bridge built under this Act and subject to its limitations shall be a lawful structure and shall be recognized and known as a post route, upon which also no higher charge shall be made for the transmission over the same of the mails, the troops, and munitions of war of the United States than the rate per mile paid for the transportation over the railroad or public highways leading to the said bridge, and shall enjoy the rights and privileges of other post roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies, and the United States shall have the right of way across said bridge and its approaches for postal telegraph and telephone purposes.

Lawful structure and post route.

Telegraph, etc., companies.

SEC. 7. That all railroad companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of railway trains over the same and the approaches thereto upon payment of a reasonable compensation for such use; or, in case of disagreement, upon such terms and conditions as shall be prescribed by the Secretary of War upon hearing the allegations and proofs of the parties in interest.

Rights of railroads to use.

SEC. 8. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 3, 1901.

March 3, 1901.

**CHAP. 853.**—An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and two, and for other purposes.

Appropriations for sundry civil expenses.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the following sums be, and the same are hereby, appropriated, for the objects hereinafter expressed, for the fiscal year ending June thirtieth, nineteen hundred and two, namely:

* * * * *

War Department.

## UNDER THE WAR DEPARTMENT.

* * * * *

Washington, D. C.

### BUILDINGS AND GROUNDS IN AND AROUND WASHINGTON.

Buildings and grounds.

For the improvement and care of public grounds, as follows:

For improvement and maintenance of grounds south of Executive Mansion, four thousand dollars.

Improvement and care.

For ordinary care of greenhouses and nursery, two thousand dollars.

For ordinary care of Lafayette Park, one thousand dollars.

For ordinary care of Franklin Park, one thousand dollars.

For improvement and ordinary care of Lincoln Park, two thousand dollars.

For care and improvement of Monument Grounds, five thousand dollars.

Reservation No. 17.

Proviso. Expenditure.

For continuing improvement of reservation numbered seventeen, and site of old canal northwest of same, two thousand five hundred dollars: *Provided*, That no part thereof shall be expended upon other than property belonging to the United States.

For construction and repair of post-and-chain fences, repair of high iron fences, constructing stone coping about reservations, painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; manure, and hauling the same, and removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime, whitewashing, and stock for nursery, flower pots, twine, baskets, wire, splints, moss, and lycopodium, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances, cleaning statues, and repairing pedestals, sixteen thousand and fifty dollars.

For improvement, care, and maintenance of various reservations, twenty thousand dollars.

For improvement, maintenance, and care of Smithsonian grounds, two thousand five hundred dollars.

For improvement, care, and maintenance of Judiciary Park, two thousand five hundred dollars.

For laying asphalt walks in various reservations, two thousand dollars.

One-half of the foregoing sums under "Buildings and grounds in and around Washington" shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Half appropriations from District revenues.

Of the whole amount appropriated in the legislative, executive, and judicial appropriation Act for the fiscal year nineteen hundred and two, under the title "Public buildings and grounds," the sum of twenty-eight thousand three hundred and ninety dollars shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States.

That under appropriations herein contained no contract shall be made for making or repairing concrete or asphalt pavements in Washington City at a higher price than one dollar and eighty cents per square yard for a quality equal to the best laid in the District of Columbia prior to July first, eighteen hundred and eighty-six, and with a base of not less than six inches in thickness.

Limit for concrete, etc., pavements.

For improvement, care, and maintenance of grounds of Executive Departments, one thousand dollars.

For improvement and maintenance of Executive Mansion grounds (within iron fence), one thousand dollars.

For taking down, repairing, and resetting the Lincoln statue in front of Court-House, six hundred dollars.

For placing inscriptions on the unmarked statues of Lafayette and Hancock, one hundred dollars.

For construction of a brick building for shops, for carpenter, plumber, blacksmith, painter, and for each and every purpose connected therewith, for the entire system of parks under Office of Public Buildings and Grounds, eight thousand five hundred dollars, to be immediately available.

For construction of a plant house at propagating gardens, two thousand five hundred dollars, to be immediately available.

For the employment of an engineer by the officer in charge of public buildings and grounds, two thousand four hundred dollars.

EXECUTIVE MANSION: For care, repair, and refurnishing of Executive Mansion, twenty thousand dollars, to be expended by contract or otherwise, as the President may determine.

Executive Mansion.

For fuel for the Executive Mansion, greenhouses, and stable, three thousand dollars.

For care and necessary repair of greenhouses, five thousand dollars.

For repairs to conservatory, Executive Mansion, two thousand dollars.

LIGHTING THE EXECUTIVE MANSION AND PUBLIC GROUNDS: For gas, pay of lamplighters, gas fitters, and laborers; purchase, erection, and repair of lamps and lamp-posts; purchase of matches, and repairs of all kinds; stoves, fuel, and lights for office and office stable, watchmen's lodges, and for the greenhouses at the nursery, twelve thousand five hundred dollars: *Provided*, That for each five-foot burner not connected with a meter in the

Lighting.

*Proviso*—maximum per lamp.

lamps on the public grounds not more than twenty dollars shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair, under any expenditure provided for in this Act; and said lamps shall burn every night, on the average, from fifteen minutes after sunset to forty-five minutes before sunrise; and authority is hereby given to substitute other illuminating material for the same or less price, and to use so much of the sum hereby appropriated as may be necessary for that purpose: *Provided further*, That three thousand four hundred dollars of the foregoing sum shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States.

to burn every night, etc.

amount payable from District revenues.

Electric lights.

For lighting six arc electric lights in Executive Mansion grounds within the iron fence three hundred and sixty-five nights, at not exceeding seventy-two dollars per light per annum, which shall cover the entire cost to the United States of lighting and maintaining in good order each electric light in said grounds, four hundred and thirty-two dollars.

—in parks.

For lighting arc electric lights in public grounds as follows: For seven in grounds south of the Executive Mansion; thirty-two in Lafayette, Franklin, Judiciary, and Lincoln parks, and fourteen in grounds south of Executive Mansion and in Monument Park, at not exceeding seventy-two dollars per light per annum, which sums shall cover the entire cost of lighting and maintaining in good order each of said arc electric lights; in all, three thousand eight hundred and sixteen dollars, one-half of which sum shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Repair of water pipes.

REPAIR OF WATER PIPES: For repairing and extending water pipes, purchase of apparatus for cleaning them, purchase of hose, and for cleaning the springs and repairing and renewing the pipes of the same that supply the Capitol, the Executive Mansion, and the building for the State, War, and Navy Departments, two thousand five hundred dollars.

Telegraph. Capitol, Departments, etc.

TELEGRAPH TO CONNECT THE CAPITOL WITH THE DEPARTMENTS AND GOVERNMENT PRINTING OFFICE: For care and repair of existing lines, one thousand five hundred dollars.

Washington Monument. Maintenance.

WASHINGTON MONUMENT: For the care and maintenance of the Washington Monument, namely: For one custodian, at one hundred dollars per month; one steam engineer, at eighty-dollars per month; one assistant steam engineer, at sixty dollars per month; one fireman, at fifty dollars per month; one assistant fireman, at forty-five dollars per month; one conductor of elevator car, at seventy-five dollars per month; one attendant on floor, at sixty dollars per month; one attendant on top floor, at sixty dollars per month; three night and day watchmen, at sixty dollars per month each; in all, eight thousand five hundred and twenty dollars.

Fuel, etc.

For fuel, lights, oil, waste, packing, tools, matches, paints, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors, repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery, and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric-light plant in good order, three thousand dollars.

Addition to boiler house.

Laws 1st session 56th Congress, p. 623.

That the appropriation of six thousand five hundred dollars for addition to boiler house of the Washington Monument, made by sundry civil Act approved June sixth, nineteen hundred, is hereby also made available for the necessary water-pipe connections and for each and every purpose necessary to make said boiler house most effective for the elevator service.

## MILITARY POSTS.

Military posts.

*     *     *     *     *

Governor's Island. Enlarging, etc.

Toward the enlargement of Governor's Island, two hundred thousand dollars; * * * in accordance with the plan reported by a board composed of Major-General John R. Brooke, Colonel George L. Gillespie, and Colonel Amos S. Kimball, dated July twenty-first [August seventeenth], nineteen hundred, * * *

*     *     *     *     *

Yellowstone National Park.

IMPROVEMENT OF THE YELLOWSTONE NATIONAL PARK: For the improvement of the Yellowstone National Park, and for the maintenance and repair of existing improvements, to be expended by and under the direction of the Secretary of War, one hundred and thirteen thousand dollars, to be immediately available: *Provided*, That of this amount twenty-five thousand dollars, or so much thereof as may be necessary, may be, in the discretion of the Secretary of War, expended in the Yellowstone and Teton forest reserves east and south of the park.

*Proviso.* Amount available for Yellowstone and Teton forest reserves east and south of park.

*     *     *     *     *

## ENGINEER DEPARTMENT.

Engineer Department.

Rivers and harbors improvements.

Toward the construction of works on harbors and rivers, under contract or otherwise, and within the limits authorized by law, namely:

For works authorized by the river and harbor Act of eighteen hundred and ninety-six, as follows:

Locks, etc., Allegheny River, Pa.

Locks and dams in Allegheny River, Pennsylvania: For continuing construction of locks and dams at Herr Island, above the head of Sixmile Island, and at Springdale, one hundred and twenty-six thousand dollars.

Bayou Plaquemine, La.

Improving Bayou Plaquemine, Louisiana: For completing improvements, two hundred and ten thousand dollars.

Buffalo, N. Y.

Improving harbor at Buffalo, New York: For continuing improvement, four hundred thousand dollars.

Cumberland Sound, Ga. and Fla.

Improving Cumberland Sound, Georgia and Florida: For continuing improvement, two hundred thousand dollars.

Harbor of Refuge, Delaware Bay.

Harbor of refuge, Delaware Bay, Delaware: For continuing construction, two hundred and thirteen thousand dollars.

Duluth, Minn., and Superior, Wis.

Improving harbor at Duluth, Minnesota, and Superior, Wisconsin: For continuing improvement, three hundred and twenty thousand dollars.

Grays Harbor, Wash.

Improving Grays Harbor, Washington: For continuing improvement of harbor and bar entrance, one hundred and thirty-eight thousand two hundred and twenty-five dollars.

Illinois and Mississippi Canal.

Illinois and Mississippi Canal: For continuing construction, nine hundred and seventy-five thousand dollars.

Kentucky River, Ky.

Improving Kentucky River, Kentucky: For continuing improvement, one hundred and fifty thousand dollars.

Waterway from Keweenaw Bay to Lake Superior, Mich.

Improving waterway from Keweenaw Bay to Lake Superior, Michigan: For continuing improvement of water communication across Keweenaw Point, one hundred and forty-five thousand dollars.

Portland, Me.

Improving harbor at Portland, Maine: For continuing improvement, twenty-one thousand dollars.

Providence River and Narragansett Bay, R. I.

Improving Providence River and Narragansett Bay, Rhode Island: For continuing improvement, fifty-nine thousand dollars.

San Pedro, Cal.

Improving harbor at San Pedro, California: For continuing construction of breakwater, one hundred and forty-six thousand dollars.

Winyaw Bay, S. C.

Improving Winyaw Bay, South Carolina: For continuing improvement of harbor at Winyaw Bay, five hundred thousand dollars.

Yazoo River, Miss.

Improving Yazoo River, Mississippi: For completing improvement of mouth of Yazoo River and harbor of Vicksburg, five hundred and ten thousand dollars.

For works authorized by the river and harbor Act of eighteen hundred and ninety-nine, as follows:

Ashtabula, Ohio.

Improving harbor at Ashtabula, Ohio: For continuing improvement, two thousand dollars.

Boston, Mass.

Improving harbor at Boston, Massachusetts: For completing improvement under project for thirty-foot depth through Broad Sound Channel, one hundred and thirty-three thousand dollars.

Bridgeport, Conn.

Improving harbor at Bridgeport, Connecticut: For continuing improvement, fifty thousand dollars.

Gowanus Bay, N. Y.

Improving channel in Gowanus Bay, New York: For continuing improvement of Bay Ridge and Red Hook channels, one hundred and forty thousand dollars.

Black Warrior River, Ala.

Improving Black Warrior River, Alabama: For completing construction of Lock and Dam Numbered Four, above Tuscaloosa, fifty-three thousand six hundred and seventy-six dollars.

Big Sandy River, W. Va. and Ky.

Improving Big Sandy River, West Virginia and Kentucky: For continuing improvement by the construction of two locks and dams between Louisa and mouth of the river, one hundred and forty thousand dollars.

Calumet Harbor, Ill.

Improving Calumet Harbor, Illinois: For continuing improvement, two hundred and fifty-five thousand dollars.

Congaree River, S. C.

Improving Congaree River, South Carolina: For continuing improvement from Gervais street bridge, Columbia, to Granby, fifty thousand dollars.

Delaware River, Pa. and N. J.

Improving Delaware River, Pennsylvania and New Jersey: For continuing improvement, sixty-one thousand five hundred dollars.

Detroit River, Mich.

Improving Detroit River, Michigan: For continuing improvement, three hundred and twenty-five thousand dollars.

Everett, Wash.

Improving harbor at Everett, Washington: For continuing improvement, ninety thousand dollars.

Hudson River, N. Y.

Improving Hudson River, New York: For continuing improvement, one hundred thousand dollars.

Mississippi River from mouth of Ohio to Minneapolis.

Improving Mississippi River from the mouth of the Ohio to Minneapolis, Minnesota: For continuing improvement between Saint Paul and Minneapolis, one hundred and fifty-seven thousand dollars.

New York Harbor, Ambrose Channel.

Improving harbor at New York, New York: For continuing improvement of Ambrose Channel (formerly known as East Channel) across Sandy Hook Bar, one hundred and thirty thousand dollars.

New Haven, Conn.

Improving harbor at New Haven, Connecticut: For continuing improvements, fifty thousand dollars.

Waterway from Norfolk to Sounds of North Carolina.

Improving waterway from Norfolk, Virginia, to sounds of North Carolina: For continuing improvement of Deep Creek, Virginia, Turners Cut, Croatan Sound, and Pasquotank River, North Carolina, twenty-nine thousand eight hundred and seventy dollars.

Ohio River below Pittsburg, Pa.

Improving Ohio River below Pittsburg, Pennsylvania: For continuing construction of Dams Numbered Thirteen and Eighteen, forty thousand dollars.

Ocmulgee River, Ga.

Improving Ocmulgee River, Georgia: For continuing improvement, forty thousand dollars.

Patapsco River, Md.

Improving Patapsco River, Maryland: For continuing improvement of channel to Baltimore, four hundred and seventy-five thousand three hundred and fifty-two dollars.

Potomac River.

Improving Potomac River: For improvement below the city of Washington, ninety-eight thousand dollars.

St. Joseph, Mich.

Improving harbor at Saint Joseph, Michigan: For completing improvement, thirty-eight thousand dollars.

Savannah River, Ga.

Improving Savannah River, Georgia: For continuing improvement between Augusta and Savannah, one hundred thousand dollars.

Tampa Bay, Fla.

Improving Tampa Bay, Florida: For continuing improvement of channel from the Gulf of Mexico to Port Tampa, one hundred and twenty-seven thousand dollars.

Toledo, Ohio, harbor.

Improving harbor at Toledo, Ohio: For continuing improvement, eight thousand dollars.

Warrior and Tombigbee rivers, Ala. and Miss.

Improving Warrior and Tombigbee rivers, Alabama and Mississippi: For continuing improvement of Warrior River by the construction of the three locks and dams next below Tuscaloosa, two hundred and forty thousand dollars.

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Miscellaneous.

## MISCELLANEOUS OBJECTS, WAR DEPARTMENT.

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Maps.

MAPS, WAR DEPARTMENT: For publication of maps for use of the War Department, inclusive of war maps, five thousand dollars.

Survey of northern, etc., lakes.

SURVEY OF NORTHERN AND NORTHWESTERN LAKES: For survey of northern and northwestern lakes, including all necessary expenses of correcting, extending, printing, and issuing charts, and of investigating lake levels, with a view to their regulation, to be available until expended, one hundred thousand dollars.

Transporting maps.

TRANSPORTATION OF REPORTS AND MAPS TO FOREIGN COUNTRIES: For the transportation of reports and maps to foreign countries through the Smithsonian Institution, one hundred dollars.

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California Débris Commission.
Vol. 27, p. 507.

CALIFORNIA DÉBRIS COMMISSION: For defraying the expenses of the commission in carrying on the work authorized by the Act of Congress approved March first, eighteen hundred and ninety-three, fifteen thousand dollars.

New York Harbor.

HARBOR OF NEW YORK: For prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City:

Inspectors, etc.

For pay of inspectors and deputy inspectors, office force, and expenses of office, ten thousand two hundred and sixty dollars;

For pay of crews and maintenance of five steam tugs and three launches, fifty-eight thousand three hundred and forty dollars;

Repairs, tug Nimrod.

For electric plant and steam steering gear and installing same, and generally overhauling and repairing steam tug Nimrod, four thousand two hundred dollars;

In all, seventy-two thousand eight hundred dollars.

Statue of Gen. John A. Logan.
Expenses unveiling.

STATUE OF GENERAL JOHN A. LOGAN: To defray the expenses attending the unveiling of the statue of General John A. Logan, lately erected in Iowa circle, in the city of Washington, District of Columbia, one thousand five hundred dollars, or so much thereof as may be necessary, to be expended under the direction of the commission charged with the selection of a site and erection of a pedestal for said statue, to be immediately available.

—of Gen. George B. McClellan.
Site and pedestal authorized.

STATUE OF GENERAL GEORGE B. MCCLELLAN: For the preparation of a site and the erection of a pedestal for a statue of the late Major-General George B. McClellan in the city of Washington, said site to be selected by and said pedestal erected under the supervision of the chairman of the Joint Committee on the Library, the Secretary of War, and the chairman of the McClellan statue committee of the Society of the Army of the Potomac, fifty thousand dollars: *Provided*, That any part of this sum not required for the site and pedestal may be used and expended for the completion of the statue of General McClellan: *And provided further*, That said statue shall not be located in the grounds of the Capitol or Library of Congress.

*Provisos.*
—balance available for statue.
—location.

* * * * *

## PUBLIC PRINTING AND BINDING.

* * * * *

For completion of construction of a fire-proof building for the use of the Government Printing Office and for each and every purpose connected therewith, including the cost of all professional and other personal services that the Chief of Engineers of the Army may deem necessary and for necessary books and periodicals, and for the rent of office rooms in a locality convenient to the work, to be expended under the direction and supervision of the said Chief of Engineers, one million three hundred and four thousand dollars, which shall be immediately available.

**Appropriation for new building.**

SEC. 2. That all sums appropriated by this Act for salaries of officers and employees of the Government shall be in full for such salaries for the fiscal year nineteen hundred and two, and all laws or parts of laws in conflict with the provisions of this Act be, and the same are hereby, repealed.

**Appropriation for salaries to be in full, etc.**

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Approved, March 3, 1901.

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**CHAP. 874.**—An Act To authorize the Charleroi and Monessen Bridge Company to construct and maintain a bridge across the Monongahela River.

**March 3, 1901.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Charleroi and Monessen Bridge Company, a corporation existing under the laws of the State of Pennsylvania is hereby authorized to construct, maintain, and operate a highway bridge across the Monongahela River, from a point in the borough of North Charleroi, county of Washington and State of Pennsylvania, to a point on the opposite side of the river, in the township of Rostraver, county of Westmoreland, and State of Pennsylvania. The said bridge, when built in accordance with this Act, shall be a legal structure, and may be used for all the purposes of a highway bridge.

**Charleroi and Monessen Bridge Company may bridge Monongahela River.**
**—location, etc.**

SEC. 2. That the channel span of any bridge built under the provisions of this Act shall not be less than fifty-four feet above the level of the water at pool full in said river, measured to the lowest part of the superstructure thereof, nor shall the said span be less than three hundred feet in length in the clear, and the piers of the bridge shall be parallel with the current of the river, and the said span shall be over the main channel of the river at ordinary water: *Provided*, That any bridge constructed under this Act and according to its limitations shall be a lawful structure and shall be known and recognized as a post route, and the same is hereby declared to be a post route, upon which, also, no higher charge shall be made for the transportation over the same of the mails, the troops, or munitions of war of the United States than the rate per mile

**Spans, etc.**

***Proviso.***
**Lawful structure and post route.**

paid for transportation over railroads or public highways leading to the said bridge.

Secretary of War to approve plans.

SEC. 3. That the bridge authorized to be constructed under this Act shall be located and built under and subject to such regulations for the security of navigation of said river as the Secretary of War shall prescribe, and to secure that object the bridge company shall submit to the Secretary of War, for his examination and approval, a design and drawing of the bridge and a map of the location, giving for the space of three-fourths of a mile above the proposed location the depths and currents at all points of the same and the depths and the currents as far below the proposed location as he may require, and also give the location of any other bridge for three-fourths of a mile above and below the proposed location, together with all other information touching the said bridge and river as may be deemed requisite by the Secretary of War to determine whether said bridge when built will conform to the provisions of this Act and cause any serious obstruction to the navigation of the river or injuriously affect the flow of water.

Notification of approval, etc.

SEC. 4. That the Secretary of War is hereby authorized and directed, upon receiving said plan and map and upon being satisfied that a bridge built upon such a plan and at said locality will conform to the provisions of this Act and cause no serious obstruction to the navigation of the river or injuriously affect the flow of water, to notify said company that he approves the same; and upon receiving such notification the said company may proceed to the erection of said bridge, conforming strictly to the approved plan and location. But until the Secretary of War shall approve the plan and location of the said bridge and notify the said company of the same in writing the bridge shall not be commenced; and should any change be made in the plan of the bridge during the progress of the work thereon, such change shall be subject likewise to the approval of the Secretary of War.

Transit.

SEC. 5. That said bridge shall be constructed and used for the passage of wagons and vehicles of all kinds, for the transit of animals and foot passengers, for the erection and maintenance thereon of telegraph and telephone wires, and the passage and operation of street cars over the same, for such reasonable rates of toll as may be fixed by the laws of the State of Pennsylvania, or may be agreed upon between the bridge company and such persons or corporations using the same, where the rates of toll are not fixed by law; and in case the parties interested shall fail to agree upon the sum to be paid and upon the rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall, upon the application of either party, be determined by the circuit court of the United States in and for any district in which any portion of said bridge may be. The United States shall also have the right of way over said bridge for postal-telegraph and telephone purposes: *Provided*, That all street railroad companies desiring the use of said bridge

—tolls.

—litigation.

—postal telegraph, etc.

*Proviso.* Street railways.

shall have and be entitled to equal rights and privileges relative to the passage of railway trains or cars over the same, and over the approaches thereto, and all telephone and telegraph companies shall be granted equal rights and privileges in the construction and operation of their lines across said bridge.

Telephone, etc., companies.

SEC. 6. That said bridge herein authorized to be constructed shall so be kept and managed at all times as to afford proper means and ways for the passage of vessels, barges, or rafts, both by day and by night, and there shall be displayed on said bridge by the owners thereof, from sunrise to sunset, such lights or other signals as the Light-House Board may prescribe; and such changes may be made from time to time in the structure of said bridge as the Secretary of War may direct, at the expense of the said company, in order the more effectually to preserve the free navigation of said river; and in case of any litigation arising from any alleged obstruction to the navigation of any of said rivers created by the construction of any bridge under this Act, the cause or question arising may be tried before the circuit court of the United States in and for any district in which any portion of said obstruction or bridge may be.

Aids to navigation.

Lights.

Alterations.

Litigation.

SEC. 7. That this Act shall be null and void unless the construction of said bridge shall be commenced within one year and completed within three years from the passage of this Act.

Commencement and completion.

SEC. 8. That Congress shall have power at any time to alter, amend, or repeal this Act.

Amendment

Approved, March 3, 1901.

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**CHAP. 876.**—An Act To incorporate the Society of American Florists and Ornamental Horticulturists within the District of Columbia.

March 3, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That James Dean, of Freeport, * * * in the State of New York; * * * and Charles W. Hoitt of Nashua, in the State of New Hampshire, their associates and successors, are hereby created a body corporate and politic, within the District of Columbia, by the name of the Society of American Florists and Ornamental Horticulturists, for the development and advancement of floriculture and horticulture in all their branches, to increase and diffuse the knowledge thereof, and for kindred purposes in the interest of floriculture and horticulture. Said association is authorized * * * to hold real and personal estate in the District of Columbia * * *: *Provided*, That this corporation shall not be permitted to occupy any park of the city of Washington.

District of Columbia.

Society of American Florists and Ornamental Horticulturists incorporated.

Incorporators.

Purposes of incorporation.

Powers.

—to hold real estate.

Not to use parks.

SEC. 2. That Congress reserves the right to alter, amend, or repeal this Act in whole or in part.

Amendment.

Approved, March 3, 1901.

March 3, 1901

**CHAP. 877.—An Act To authorize the Paris, Choctaw and Little Rock Railway Company to construct and maintain a bridge across Red River, in the State of Texas.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Paris, Choctaw and Little Rock Railway Company, a corporation duly created under and by virtue of the laws of the State Texas, be, and is hereby, authorized to build a bridge across Red River, at a point suitable to the interest of navigation, at or near Hooks Ferry, Red River County, Texas, the said bridge to be so constructed as to not interfere with the navigation of said river: *Provided*, That any bridge constructed under this Act and according to its limitations shall be a lawful structure, and shall be known and recognized as a post route, and the same is hereby declared to be a post route, upon which no higher rate shall be charged for the transmission over the same of the mails, the troops, and the munitions of war of the United States, or for through passengers or freight passing over said bridge, than the rate per mile paid for their transportation over the railways leading to said bridge; and the United States shall have the right of way for postal-telegraph and telephone purposes over said bridge.

Paris, Choctaw and Little Rock Railway may bridge Red River at Hooks Ferry, Tex.

*Proviso.*
Lawful structure and post route.

Postal telegraph, etc.

SEC. 2. That any bridge constructed under this Act shall be built and located under and subject to such regulations for the security of the navigation of said river as the Secretary of War shall prescribe, and to secure that object the said company shall submit to the Secretary of War, for his examination and approval, a design and drawings of the bridge and piers, and a map of the location, giving for the space of at least one mile above and one mile below the proposed location the topography of the banks of the river, the shore lines at high and low water, and the direction and strength of the current at all stages, and the soundings, accurately showing the bed of the stream, the location of any other bridge or bridges, and shall furnish such other information as may be required for a full and satisfactory understanding of the subject; and until said plan and location of the bridge are approved by the Secretary of War the bridge shall not be built, and if any change be made in the plan of construction of said bridge during the progress of the work thereon, or after the completion of said bridge, such change shall be subject to the approval of the Secretary of War; and the said structure shall be so kept and managed at all times as to offer reasonable and proper means for the passage of vessels through or under said structure; and for the safety of vessels passing at night there shall be displayed on said bridge, from sunset to sunrise, at the expense of the owners thereof, such lights and other signals as may be prescribed by the Light-House Board; and the said structure shall be changed and altered at the cost and expense of the owners thereof from time to time as the Secretary of War may direct, so as to preserve the free and convenient navigation of said river.

Secretary of War to approve plans.

Changes.

Aids to navigation.

Lights.

Alterations.

Rights of railroads to use.

SEC. 3. That all railway companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of cars over the same and the approaches thereto upon the payment of a reasonable compensation for such use; and in case the owner or owners of said bridge and several companies, or any one of them, desiring such use shall fail to agree upon the sum or sums to be paid and upon the rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties. And equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies.

Telegraph, etc., companies.

Commencement and completion.

SEC. 4. That this Act shall be null and void if actual construction of the bridge herein authorized is not commenced within one year and completed within three years from the date hereof.

Amendment.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 3, 1901.

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March 3, 1901.

**CHAP. 878.—An Act to authorize the Pigeon River Improvement, Slide, and Boom Company, of Minnesota, to enter upon the Grand Portage Indian Reservation, and improve the Pigeon River in said State at what is known as the cascades of said river.**

Pigeon River Improvement, Slide, and Boom Company may improve Pigeon River on Grand Portage Indian Reservation, Minn.

Use of timber by company.

—proceeds credited to Chippewa Indians, Minn.

*Provisos.*

River open to passage of timber.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Pigeon River Improvement, Slide, and Boom Company, a corporation organized and existing under the laws of the State of Minnesota, be, and hereby is, authorized, under such rules and regulations and subject to such conditions and limitations as the Secretary of the Interior may prescribe, to enter upon and improve the Pigeon River at what is known as the cascades of said river, for the purpose of making said river at said point navigable for floating logs, and to that end to enter upon the unallotted lands, and, with the consent of the allottees, upon any allotted lands, adjacent to said cascades, of the Grand Portage Indian Reservation, in said State, and to construct such sluice dams, wing dams, bulkheads, spill dams, and other works necessary for said purpose, and to take from said unallotted lands timber for the construction of said improvements and works in quantity not to exceed one hundred and twenty-five thousand feet, board measure, for which timber said company shall pay such price as may be agreed upon between said company and the Secretary of the Interior, but not less than five dollars per thousand feet, board measure, the proceeds to be placed in the Treasury of the United States to the credit of the Chippewa Indians in Minnesota: *Provided,* That said river after being so improved shall be open at all times to the free passage of all timber cut from said Grand Portage Indian Reservation, and to the passage of

Fishways.

all other timber for a reasonable charge therefor: *Provided further*, That suitable fishways shall be constructed and maintained by said company, to be approved by the United States Fish Commission.

Approved, March 3, 1901.

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March 3, 1901.

**CHAP. 879.—An Act To authorize the Portland, Nehalem and Tillamook Railway Company to construct a bridge across Nehalem Bay and River, in the State of Oregon.**

Portland, Nehalem and Tillamook Railway may bridge Nehalem Bay and River, Oreg.

Proviso. location.

Transit, etc.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That the Portland, Nehalem and Tillamook Railway Company, a corporation created and existing under the laws of Oregon, its successors and assigns, be, and is hereby, authorized to construct and maintain a bridge and approaches thereto across the upper portion of Nehalem Bay, or across the main channel of, or the North Fork of, the Nehalem River, to the opposite shore of said bay or rivers, in the county of Tillamook and State of Oregon: *Provided*, That a location is found within or near Nehalem Bay suitable to the interests of navigation and satisfactory to the Secretary of War. Said bridge will be constructed where necessary for the crossing of said bay and rivers with said railway company's railway at such points as may be selected by the said railway company, and subject to the approval of the Secretary of War, and shall be so constructed as to provide for the passage of railroad trains, and, at the option of said railway company by which it may be built, may be used for the passage of wagons and vehicles of all kinds, for the transit of animals and foot passengers, for such reasonable rates of toll as may be fixed by the said railway company and approved by the Secretary of War.

Lawful structure and post route.

Telegraph etc., companies.

*Proviso.* Rights of railroads to use.

SEC. 2. That any bridge built under this Act, and subject to its limitations, shall be a lawful structure, and shall be recognized and known as a post route, and shall enjoy the same rights and privileges as other post roads in the United States; and equal privileges in the use of said bridge shall be granted to all telegraph and telephone companies; and the United States shall have the right of way across said bridge and its approaches for postal-telegraph and telephone purposes: *Provided*, That all railway companies desiring the use of said bridge shall have and be entitled to equal rights and privileges relative to the passage of cars over the same and the approaches thereto upon the payment of a reasonable compensation for such use; and in case the owner or owners of said bridge and several companies, or any one of them, desiring such use shall fail to agree upon the sum or sums to be paid and upon the rules and conditions to which each shall conform in using said bridge, all matters at issue between them shall be decided by the Secretary of War upon a hearing of the allegations and proofs of the parties.

Aids to navigation.

SEC. 3. That the bridge across said Nehalem Bay or the main or North Fork of Nehalem River shall be so constructed, whether by draw, span, or otherwise, that a free and unobstructed passage may be secured to all vessels and other water craft navigating said bay or rivers, and be built under and subject to such regulations for the security of the navigation of the said bay or rivers over which they may be built as the Secretary of War may prescribe; and to secure that object the said company or corporation shall submit to the Secretary of War, for his examination and approval, designs and drawings of the bridge and maps of location selected; and until said plans and locations are approved by the Secretary of War the bridge shall not be commenced or built; and should any changes be made in the plans of said bridge during the process of construction or after completion such changes shall be subject to the approval of the Secretary of War; and all changes in said bridge required by the Secretary of War at any time shall be at the expense of the corporations or persons owning or operating said bridge: *Provided*, That for the safety of vessels passing at night there shall be displayed on said bridge, from sunset to sunrise, at the expense of the owners thereof, such lights and other signals as the Light-House Board may prescribe.

Secretary of War to approve plan.

Changes.

*Proviso.* Lights.

Amendment.

SEC. 4. That Congress may, at any time, alter, amend, or repeal this Act.

Commencement and completion.

SEC. 5. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within four years from the date hereof.

Approved, March 3, 1901.

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March 3, 1901.

**CHAP. 880.—An Act To authorize the city of Nashville, Tennessee, to construct a free public bridge across the Cumberland River within the corporate limits of said city.**

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the mayor and city council of Nashville, a municipal corporation located in Davidson County, State of Tennessee, be, and is hereby, authorized to construct, maintain, and operate a free public bridge across the Cumberland River at the foot of Broad street, within the corporate limits of said city, provided such location is, in the judgment of the Secretary of War, suitable to the interests of navigation.

Nashville, Tenn., may bridge Cumberland River.

Secretary of War to approve plans.

SEC. 2. That the said bridge shall be located and built subject to such regulations for the security of navigation as the Secretary of War may prescribe; and to secure that object the said mayor and city council shall submit, for his examination, a design and drawing of the proposed bridge and a map of its location; and until the said plan and location shall be approved by him the bridge shall not be commenced or built; and should any change be made in said bridge, either before or after completion, such change shall likewise be subject to the approval of the Secretary of War.

Aids to navigation. Lights.

SEC. 3. That such bridge shall be so kept and managed as to offer reasonable and proper means for the passage of boats and other craft through or under the same; and for the safety of vessels passing at night there shall be displayed on said bridge, from sunset to sunrise, such lights or other signals as the Light-House Board may prescribe. And any changes in the said bridge which the Secretary of War may at any time deem necessary, and order in the interests of navigation, shall be made by the owners thereof at their own expense.

Commencement and completion.

SEC. 4. That this Act shall be null and void if the actual construction of said bridge shall not be commenced within one year and completed within three years after the date hereof.

Amendment.

SEC. 5. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 3, 1901.

## RESOLUTION.

January 22, 1901.

[No. 5.] Joint Resolution Authorizing the Secretary of War to grant permits to the executive committee on inaugural ceremonies for use of reservations or public spaces in the city of Washington on the occasion of the inauguration of the President-elect, on March fourth, nineteen hundred and one, and so forth.

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of War is hereby authorized to grant permits to the committee on inaugural ceremonies for the use of any reservations or other public spaces in the city of Washington on the occasion of the inauguration of the President-elect, on the fourth day of March, nineteen hundred and one, which, in his opinion, will inflict no serious or permanent injuries upon such reservations or public spaces or statuary thereon; and the Commissioners of the District of Columbia may designate, for such and other purposes on the occasion aforesaid, such streets, avenues, and sidewalks in said city of Washington as they may deem proper and necessary: *Provided, however,* That all stands or platforms that may be erected on the public spaces aforesaid shall be under the supervision of the said inaugural committee and in accordance with plans and designs to be approved by the Architect of the Capitol, the commissioner of public buildings and grounds, and the building inspector of the District of Columbia.

District of Columbia. Inauguration of President-elect. Permits for use of public reservations authorized.

Designation of streets to be used.

*Proviso.* Platforms, etc., supervision of, etc.

* * * * *

Temporary occupation of streets by railroads.

SEC. 6. That the Commissioners of the District of Columbia are hereby authorized to issue to steam railroad companies in said District permits to temporarily occupy additional parts of streets for the purpose of accommodating the traveling public attending the inaugural ceremonies in March, nineteen hundred and one: *Provided*, That such temporary occupation shall not exceed the period of fifteen days, and shall be subject to conditions prescribed by said Commissioners: *Provided further*, That no temporary tracks shall be laid upon or over any of the parks of the city.

*Provisos.*
—limit of time.

—use of parks forbidden.

Approved, January 22, 1901.

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## PRIVATE ACTS.

**CHAP. 679.—An Act For the relief of Franklin Lee and Charles F. Dunbar.**

March 1, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the Secretary of the Treasury be, and is hereby, authorized and directed to pay to Franklin Lee, of Buffalo, New York, and Charles F. Dunbar, of Erie, Pennsylvania, now of Buffalo, New York, the sum of ten thousand two hundred dollars, the same being for extra blasting of rock in the channel between piers of entrance to the harbor of Ashtabula, Ohio, performed by them under the direction of Major G. L. Gillespie, an officer of the Corps of Engineers, United States Army, and the amount aforesaid is hereby appropriated for the purpose aforesaid out of any money in the Treasury not otherwise appropriated.

Franklin Lee and Charles F. Dunbar.
Payment to.

Approved, March 1, 1901.

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**CHAP. 822.—An Act For the relief of Olivia M. Clifford.**

March 2, 1901.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the claim of Olivia M. Clifford for compensation for the alleged use and occupation by the United States, through its Corps of Engineers, of two certain docks or piers located in the Erie Basin, at the city of Buffalo, in the State of New York, while engaged in building the new breakwater, from January eighth, eighteen hundred and eighty-seven, to July eighth, eighteen hundred and ninety-one, be, and the same is hereby, referred to the Court of Claims to hear and determine the same to final judgment, notwithstanding the bar of the statute of limitations, with the right of appeal as in other cases.

Olivia M. Clifford.
Claim of referred to Court of Claims.

Approved, March 2, 1901.

March 2, 1901

**CHAP. 827.—An Act For the relief of the widows and children of William Ryan and John S. Taylor, deceased.**

William Ryan and John S. Taylor.

Claim of widows, etc., referred to Court of Claims.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That the claims of the widows and children of William Ryan and John S. Taylor, deceased, for compensation for the death of said decedents, which occurred on or about the first day of September, eighteen hundred and ninety-six, while they were employed by the United States in connection with the construction of a battery at Finns Point, New Jersey, be, and the same are hereby, referred to the Court of Claims, with jurisdiction to ascertain and determine whether the death of said decedents was caused by the act, neglect, or default of the United States or its agents, and without any contributory negligence upon the part of said deceased, and if it shall so appear the said court shall render judgment against the United States in favor of said widows and children for any damages, not exceeding the sum of five thousand dollars, for the widow and children of each, that may have been sustained through the death of said decedents: *Provided*, That no suit shall be brought under the provisions of this Act after six months from the passage hereof.

*Proviso.*

Limit of time for filing suit.

Approved, March 2, 1901.

# INDEX.

[The references in roman are to part (or volume) and those in arabic to page. The letter "S" indicates the supplement.]

## A.

**Abrams** Creek, Tenn., examination and survey .... I, 469; III, 2491, 2496
**Absecon** Inlet, N. J., removal of wreck at entrance .... I, 262; II, 1351
**Acts** of Fifty-sixth Congress, second session, affecting Corps of Engineers .... V, 3837
**Acushnet** River, Mass.:
  Bridge between New Bedford and Fish Island .... I, 665
  Improvement of New Bedford Harbor .... I, 163; II, 1119
**Agate** Bay Harbor, Minn., improvement of .... I, 506; IV, 2824
**Ahnapee** Harbor, Wis., improvement of .... I, 519; IV, 2923
**Alabama** River, Ala.:
  Bridge at Selma .... I, 665
  Improvement of .... I, 361; III, 1786
**Alafia** River, Fla., bridge at Riverview .... I, 664
**Alameda**, Cal. *See* Oakland.
**Albemarle** and Chesapeake Canal, N. C., improvement of waterway via. I, 297; II, 1457
**Albemarle** Sound, N. C.:
  Examination and survey of waterway via .... I, 299, 309; II, 1511
  Improvement of waterway to Norfolk, Va., via Currituck Sound. I, 297; II, 1457
  Improvement of waterway to Norfolk, Va., via Pasquotank River. I, 296; II, 1455
**Alexandria**, La., bridge across Red River between Pineville and .... I, 659
**Alexandria** and Pineville Bridge Company, bridge of .... I, 659
***Alice*** (barge), removal of wreck of .... I, 411; III, 1959
**Allegheny**, Pa.:
  Bridge across Allegheny River to Pittsburg (Fort Wayne Bridge) .... I, 662
  Harbor lines in Ohio River at .... I, 119; IV, 2709
  Improvement of Pittsburg Harbor .... I, 480; IV, 2697
**Allegheny** River, Pa.:
  Bridge at Franklin .... I, 663
  Bridge between Oil City and Franklin .... I, 663
  Bridge between Pittsburg and Allegheny (Fort Wayne Bridge) .... I, 662
  Construction of locks and dams .... I, 482; IV, 2701
  Improvement by open-channel work .... I, 483; IV, 2707
  Improvement of Pittsburg Harbor .... I, 480; IV, 2697
**Allouez** Bay, Wis. (*see* Duluth Harbor) .... I, 507; IV, 2828
**Alloway** Creek, N. J., improvement of .... I, 244; II, 1332
**Alpena** Harbor, Mich., improvement of .... I, 555; IV, 3137
**Altamaha** River, Ga., improvement of .... I, 329; II, 1642
**Alviso** Harbor, Cal., improvement of .... I, 603; IV, 3410
**Ambrose** Channel, New York Harbor, N. Y., improvement of .... I, 224; II, 1285
**Amite** River, La., improvement of .... I, 381; III, 1875
**Amphlet** Slough, San Joaquin River, Cal., examination for closure of. I, 613; IV, 3454
**Anchor**, disk, use of the .... III, 2221
**Anclote** River, Fla., improvement of .... I, 348; III, 1760
**Andura** (Nandua) Creek, Va., improvement of .... I, 295; II, 1454
**Annapolis** Harbor, Md., harbor lines .... I, 119; II, 1396
**Ann**, Cape, Mass., construction of harbor of refuge in Sandy Bay .... I, 141; II, 1048
**Antioch**, Cal., examination and survey of waterway to Suisun Point .... I, 613; IV, 3449, 3452
**Apalachicola** Bay and River, Fla.:
  Improvement of bay .... I, 351; III, 1767
  Improvement of river, including the Cut-off .... I, 352; III, 1769
***Applegate, Samuel*** (schooner), removal of wreck of .... I, 263; II, 1352
**Appleton**, Wis., bridge across Fox River Canal at .... I, 664

- Appomattox River, Va.:
  - Examination and survey for deflection of, at Petersburg ... I, 299; II, 1467, 1471
  - Improvement of .......... I, 294; II, 1452
- Appoquinimink River, Del.:
  - Improvement of .......... I, 250; II, 1339
  - Removal of wreck below Odessa Landing .......... I, 263; II, 1352
- Appropriations. *See* Fortifications *and* Rivers and harbors.
- Aqueduct Bridge, Washington, D. C., repair of .......... I, 669; V, 3637
- Aqueduct, Washington, D. C. *See* Washington.
- Aransas Pass, Tex., improvement of .......... I, 409; III, 1952
- Arcata, Cal. (*see* Humboldt Harbor) .......... I, 611; IV, 3431
- Arch Rock, San Francisco Harbor, Cal., removal of .......... I, 604; IV, 3411
- *Ardanhu* (steamer), removal of wreck of .......... I, 174; II, 1147
- Arkansas River:
  - Examination and survey for permanent improvement .......... I, 433; III, 2128
  - Gauging (*see* Mississippi River) .......... I, 425; III, 2072; S., 8, 45, 126
  - General improvement .......... I, 426; III, 2098
  - Removal of obstructions .......... I, 425; III, 2095
- Arlington, Wash., bridge across Stilaguamish River .......... I, 667
- Armament. *See* Fortifications.
- Arthur Kill, N. Y. and N. J.:
  - Harbor lines .......... I, 118; II, 1279
  - Improvement of Staten Island-New Jersey channel .......... I, 215; II, 1233
- Arthur Lake, La. (*see* Mermentau River) .......... I, 392; III, 1901
- Artillery Corps:
  - Reservation at Willets Point, N. Y., transferred to the .......... I, 42
  - Tugboat for transfer to the .......... I, 38
- Ashland, Ky., bridge across Ohio River between Ironton, Ohio, and .......... I, 660
- Ashland, Wis., improvement of harbor .......... I, 509; IV, 2863
- Ashland and Ironton Bridge Company, bridge of .......... I, 660
- Ashley River, S. C., examination and survey .......... I, 324; II, 1619, 1623
- Ashtabula Harbor, Ohio:
  - Improvement of .......... I, 581; IV, 3260
  - Water levels .......... I, 681; V, 3776
- Assawaman Bay, Del., improvement of waterway via .......... I, 260; II, 1348
- Assistants:
  - Civilian, to engineer officers .......... I, 37, 38
  - On duty in Office of the Chief of Engineers .......... I, 688
- Astoria, N. Y., bridge across East River at Hell Gate, near .......... I, 664
- Astoria, Oreg. (*see* Columbia River, below Tongue Point) .......... I, 634; V, 3565
- Atchafalaya River, La., rectification of mouth by Mississippi River Commission .......... I, 657; S., 3, 32
- Atlanta, Knoxville and Northern Railway Company, bridge of .......... I, 668
- Atlantic City, N. J.:
  - Bridge across Inside Thoroughfare at .......... I, 664
  - Examination and survey of Beach Thoroughfare .......... I, 263; II, 1353, 1355
  - Removal of wreck at entrance to Absecon Inlet .......... I, 262; II, 1351
  - Removal of wreck in Atlantic Ocean, off .......... I, 263; II, 1353
- Atlantic County, N. J., bridge of .......... I, 664
- Atlantic Ocean:
  - Disbursements for examinations and surveys of waterways between Great Lakes and .......... I, 118
  - Removal of wreck off Atlantic City, N. J .......... I, 263; II, 1353
  - Removal of wreck off Seabright, N. J .......... I, 223; II, 1247
- Atlantic (South) States, removal of water hyacinths from Florida waters .......... I, 341; II, 1746
- Augusta, Ga.:
  - Improvement of Savannah River above .......... I, 327; II, 1636
  - Improvement of Savannah River between Savannah and .......... I, 326; II, 1634
- Aux Becs Scies Lake, Mich. (*see* Frankfort Harbor) .......... I, 550; IV, 3122

### B.

- Back Bay, Biloxi, Miss., bridge across .......... I, 659
- Back Cove, Portland, Me.:
  - Bridge (Tukeys) obstructing .......... I, 668
  - Harbor lines .......... I, 118; II, 1027
  - Improvement of .......... I, 131; II, 1006

**Back Creek, Md., removal of sunken logs** ... I, 272; II, 1390
Bagaduce River, Me., improvement of ... I, 125; II, 996
*Bailey, Electa* (schooner), removal of wreck of ... I, 174; II, 1147
Baltimore and Ohio Railroad Company, bridge of ... I, 664
Baltimore and Potomac Railroad Company, contract with, for highway bridge at Washington, D. C ... I, 119
Baltimore Harbor, Md.:
  Defenses of ... I, 6, 22, 784
  Estimate of cost of deepening and widening channel of Curtis Bay, and of main ship channel of Patapsco River and ... I, 273; II, 1394
  Improvement at Spring Garden ... I, 266; II, 1379
  Improvement of channel to ... I, 264; II, 1374
  Improvement of channel to Curtis Bay ... I, 265; II, 1379
  Removal of wreck in Fort McHenry Channel ... I, 272; II, 1391
  Removal of wreck in North Point Creek ... I, 272; II, 1390
Bangor Harbor, Me.:
  Harbor lines ... I, 118; II, 1022
  Improvement of Penobscot River ... I, 126; II, 997
Bank protection, subaqueous, use of lumber mattress for ... III, 2212
Barbette gun carriages ... I, 8, 9
Bar Harbor, Me.:
  Construction of breakwater ... I, 122; II, 991
  Defenses of ... I, 13, 697, 911
Barren River, Ky., operating and care of lock and dam ... I, 503; IV, 2806
Bartholomew Bayou, La. and Ark.:
  Bridge across ... I, 660
  Improvement of ... I, 417; III, 2042
Bath, Me., bridge across New Meadows River ... I, 669
Battalion of Engineers ... I, 39, 43, 943, 975
Batteries:
  Dynamite ... I, 10
  Gun and mortar ... I, 5, 7, 37
  Sand, emergency ... I, 8
*Baxter, Mary* (schooner), removal of wreck of ... I, 263; II, 1352
Bay Ridge Channel, New York Harbor, N. Y., improvement of ... I, 226; II, 1291
Bayside Channel, New York Harbor, N. Y., improvement of ... I, 224; II, 1285
Beach Thoroughfare, N. J., examination and survey ... I, 263; II, 1353, 1355
Beattys Bridge, N. C., bridge across Black River, near ... I, 664
Beaufort Harbor and Inlet, N. C.:
  Examination and survey of waterway from South Mills to and including inlet ... I, 299, 309; II, 1511
  Improvement of harbor ... I, 304; II, 1495
  Improvement of waterway to Newbern ... I, 303; II, 1493
  Improvement of waterway to New River ... I, 304; II, 1496
Beaufort Harbor and River, S. C.:
  Defenses of Port Royal Sound ... I, 6, 25, 816
  Improvement of river ... I, 323; II, 1604
  Improvement of waterway to Savannah (*see* Savannah) ... I, 324; II, 1628
  Removal of sunken logs in waterway to Charleston ... I, 324; II, 1607
Beechridge, Ill., prevention of break in Mississippi River at ... I, 438; III, 2198
Bellaire, Benwood and Wheeling Bridge Company, bridge of ... I, 660
Bellaire, Ohio, bridge across Ohio River to Benwood, W. Va ... I, 660
Belle Isle, Detroit River, Mich., removal of wreck ... I, 570; IV, 3198
Belle River, Mich.:
  Bridge in St. Clair County ... I, 666
  Improvement of ... I, 560; IV, 3152
Bellingham Bay, Wash., log boom (*see* Puget Sound) ... I, 645; V, 3581
*Benson* (schooner), removal of wreck of ... I, 584; IV, 3269
Benton, Fort, Mont., improvement of Missouri River at ... I, 452, 453; III, 2373
Benton Harbor and Benton Harbor Canal, Mich.:
  Bridges (5) obstructing Pawpaw River ... I, 668
  Improvements at (*see* St. Joseph Harbor) ... I, 537; IV, 3079
Benton Township, Mich., bridges (5) obstructing Pawpaw River at ... I, 668
Benwood, W. Va., bridge across Ohio River between Bellaire, Ohio, and ... I, 660
Benz, Rudolph, bridge of ... I, 665
Bergen County, N. J., bridge of ... I, 665
Beverly Harbor, Mass., examination and survey ... I, 150; II, 1065, 1068
Big Assawaman Bay, Del., improvement of waterway via ... I, 260; II, 1348

Big Barren River, Ky., operating and care of lock and dam .......... I, 503; IV, 2806
Big Sandy River, W. Va. and Ky.:
  Final report on survey for locks and dams, including Levisa and Tug forks .......... I, 496; IV, 2750
  Improvement of .......... I, 490; IV, 2735
  Improvement of Levisa Fork .......... I, 493; IV, 2742
  Improvement of Tug Fork .......... I, 493; IV, 2742
  Operating and care of lock and dam .......... I, 492; IV, 2741
Big Sarasota Bay, Fla. (*see* Sarasota Bay) .......... I, 344; III, 1753
Big Sioux River, S. Dak.:
  Construction of ice harbor at Sioux City .......... I, 456; III, 2373, 2377
  Examination for reservoir dam .......... I, 458; III, 2395
Big Stone Lake, Minn. and S. Dak., survey for reservoir dam .......... I, 450; III, 2342
Big Sunflower River, Miss., improvement of .......... I, 424; III, 2070
Big Timber Creek, N. J., bridge below Gloucester .......... I, 666
Billingsport, N. J., removal of wreck in Delaware River .......... I, 263; II, 1352
Biloxi, Miss., bridge of city of .......... I, 659
Biloxi Bay, Miss., bridge across Back Bay .......... I, 659
Bismarck, N. Dak., improvement of Missouri River at .......... I, 452, 453; III, 2373, 2374
Black Lake, Mich., improvement of Holland Harbor .......... I, 541; IV, 3092
Black River, Ark. and Mo., improvement of .......... I, 431; III, 2121
Black River, La., improvement of .......... I, 415; III, 2034
Black River, Mich.:
  Improvement at mouth .......... I, 558; IV, 3147
  Improvement at Port Huron .......... I, 559; IV, 3146
Black River, N. C.:
  Bridge at Still Bluff .......... I, 661
  Bridge near Beattys Bridge .......... I, 664
  Improvement of .......... I, 306; II, 1499
Black River, Ohio, improvement of Lorain Harbor .......... I, 577; IV, 3241
Black Rock Harbor, Conn. (*see* Bridgeport) .......... I, 186; II, 1177
Black Rock Harbor, N. Y.:
  Examination and survey of Lake Erie entrance to .......... I, 592; IV, 3342, 3345
  Harbor lines .......... I, 119; IV, 3349
  Improvement of Buffalo entrance to .......... I, 589; IV, 3324
Black Warrior River, Ala.:
  Examination and survey for Locks and Dams 1, 2, and 3, below Tuscaloosa .......... I, 378; III, 1858, 1861
  Improvement above Tuscaloosa .......... I, 365; III, 1816
  Improvement below Tuscaloosa .......... I, 366; III, 1824
  Operating and care of locks and dams .......... I, 366; III, 1819
Blackwater River, Fla. and Ala., improvement of .......... I, 359; III, 1784
Blackwells Island, East River, N. Y., bridge at .......... I, 665
Bladen County, N. C., bridge of .......... I, 664
Block Island, R. I.:
  Construction of harbor of refuge .......... I, 172; II, 1141
  Improvement of Great Salt Pond .......... I, 174; II, 1144
Blood River, La. (*see* Tickfaw) .......... I, 380; III, 1873
Bloomers, N. J., harbor lines in Hudson River from Pleasant Valley Landing to .......... I, 118; II, 1270
**Boards:**
  **For highway bridge at Washington, D. C .......... I, 119**
  **Of Ordnance and Fortification .......... I, 5**
  **On Fortifications and other Defenses (Endicott Board) .......... I, 5**
  **On Torpedo System .......... I, 5, 695**
  **The Board of Engineers .......... I, 5, 691**
**Boat railway, Columbia River, Oreg. and Wash .......... I, 625; V, 3491**
**Boats. *See* Dredge, Snag, *and* Tug boats, *and* Wrecks.**
**Bœuf River, La., improvement of .......... I, 418; III, 2044**
**Bogue Chitto, La., improvement of .......... I, 377; III, 1852**
**Bogue Falia, La., improvement of .......... I, 379; III, 1872**
**Bogue Inlet and Sound, N. C., improvement of waterway via .......... I, 304; II, 1496**
**Boom Island, Mississippi River, Minn., bridge at .......... I, 667**
**Boothbay Harbor, Me., bridge at .......... I, 666**
**Boston and Albany Railroad Company, bridge of .......... I, 662**
**Boston and Maine Railroad Company, bridge of .......... I, 668**

- Boston Harbor, Mass.:
  - Bridge across Chelsea Creek between Boston and Chelsea ... I, 662
  - Bridge across Fort Point Channel at Cove street ... I, 661
  - Defenses of ... I, 6, 15, 717, 913
  - Examination and survey ... I, 159; II, 1096, 1098
  - Improvement of ... I, 152; II, 1078
- Bowlders. *See* Rock.
- Brandts Ferry, San Joaquin River, Cal., bridge at ... I, 661
- Branford Harbor, Conn., examination and survey ... I, 198; II, 1188, 1191
- Brazos River, Tex.:
  - Effects of storm of September, 1900, on jetties ... I, 412; III, 2022
  - Examination and survey from the mouth to Waco ... I, 411; III, 1974, 2004, 2009
  - Improvement between Velasco and Richmond ... I, 408, 409; III, 1950, 1951
  - Improvement of mouth ... I, 407; III, 1940
- Brazos Santiago Harbor, Tex., improvement of ... I, 410; III, 1958
- Brenneckes Shoals, Osage River, Mo., estimate of cost of completing Lock and Dam No. 1, at ... I, 452; III, 2369
- Bridgeboro, N. J., removal of wreck in Rancocas River above ... I, 262; II, 1351
- Bridge Creek Landing, Va., wharf at ... I, 676; V, 3689
- Bridgeport Harbor, Conn., improvement of ... I, 186; II, 1177
- Bridges:
  - Alteration of, obstructing navigation ... I, 667
  - Aqueduct Bridge, Washington, D. C., repair of ... I, 669; V, 3637
  - Construction of ... I, 659, 661
  - Highway bridge, Washington, D. C. ... I, 119
  - Long Bridge, Washington, D. C., rebuilding of ... I, 275; II, 1399
  - Memorial Bridge, Washington, D. C ... I, 670; V, 3648
  - Stone Bridge, Sakonnet River, R. I., alteration of ... I, 165; II, 1124
  - Yellowstone National Park, construction, etc., of ... I, 682; V, 3777
- Broad Creek River, Del.:
  - Bridge at Laurel ... I, 666
  - Improvement of ... I, 270; II, 1386
- Broadkill Creek, Del., improvement of ... I, 260; II, 1347
- Broad Sound, Boston, Mass. *See* Boston.
- Bronx Kills, New York Harbor, N. Y., bridge across ... I, 665
- Bronx River, N. Y.:
  - Bridge at Westchester avenue ... I, 664
  - Harbor lines ... I, 118; II, 1266
  - Improvement of ... I, 201; II, 1203
- Brooklyn, Cal. *See* Oakland Harbor.
- Brooklyn, N. Y. *See* New York Harbor.
- Brooklyn and Jamaica Bay Turnpike Company, bridge of ... I, 663
- Brown County, Wis., bridge of ... I, 662
- *Brown, Dick* (steamboat), removal of wreck of ... I, 473; IV, 2646
- Browning road, near Camden, N. J., bridge across Cooper Creek at ... I, 662
- Browns Creek, N. Y., improvement of ... I, 209; II, 1219
- Brunswick, Ga.:
  - Improvement of inner harbor ... I, 331; II, 1649
  - Survey of outer bar ... I, 334; II, 1663, 1665
- Brunswick River, N. C., estimate of cost of removing obstructions at mouth ... I, 310; II, 1569
- Buffalo Bayou, Tex., improvement of waterway via ... I, 404; III, 1933
- Buffalo Fork, Snake River, Wyo., road to Fort Washakie ... I, 686; V, 3823
- Buffalo Fork, White River, Ark., improvement of ... I, 429; III, 2119
- Buffalo Harbor, N. Y.:
  - Examination and survey of Lake Erie entrance to Erie Basin and Black Rock Harbor ... I, 592; IV, 3342, 3345
  - Harbor lines at Erie Basin and Black Rock Harbor ... I, 119; IV, 3349
  - Improvement of ... I, 587; IV, 3305
  - Improvement of Buffalo entrance to Erie Basin and Black Rock Harbor ... I, 589; IV, 3324
  - Improvement of channels in waters connecting Great Lakes ... I, 563; IV, 3157
- Buffalo, Wis., bridge across Fox River at ... I, 664
- Buildings and grounds, public, District of Columbia ... I, 675; V, 3689
- Bull Rock Bridge, Bath, Me., obstructing New Meadows River ... I, 669
- Burlington Bay, Minn., examination and survey ... I, 514; IV, 2889, 2897

- Burlington Harbor, Vt.:
  - Estimate of cost of repair and completion of breakwater .... I, 150; II, 1072
  - Improvement of .... I, 146; II, 1052
- Burns Cut-off, San Joaquin River, Cal., bridge across .... I, 664
- Buttermilk Channel, New York Harbor, N. Y.:
  - Examination and survey .... I, 229; II, 1299, 1303
  - Improvement of .... I, 226; II, 1291
  - Removal of wreck .... I, 229; II, 1299
- Byram River, N. Y.:
  - Harbor lines .... I, 118; II, 1261
  - Improvement of Port Chester Harbor .... I, 198; II, 1198

## C.

- Cable galleries .... I, 38
- Cache River, Ark., improvement of .... I, 430; III, 2120
- Cache River, Ill., prevention of Mississippi River from breaking into. I, 438; III, 2198
- Caddo (Fairy) Lake, Tex. and La. (*see* Cypress Bayou) .... I, 414; III, 2033
- Cairo, Ill., prevention of break in Mississippi River near .... I, 438; III, 2198
- Calais, Me., repair of piers in St. Croix River below .... I, 120
- Calcasieu River, La., improvement of mouth and passes .... I, 394; III, 1903
- California Débris Commission .... I, 656; V, 3625
- California, department of, reconnaissances and explorations .... I, 683; V, 3800
- Caloosahatchee River, Fla.:
  - Examination and survey of Kissimmee River to the Gulf, via .... I, 350
  - Improvement of .... I, 343; III, 1751
- Calumet Harbor and River, Ill. and Ind.:
  - Improvement of harbor .... I, 529; IV, 2995
  - Improvement of river .... I, 530; IV, 3001
  - Survey for waterway via .... I, 534; IV, 3048, 3058
- Cambridge Harbor, Md., removal of wrecks .... I, 272; II, 1390, 1391
- Camden, Ark., examination of Ouachita River at .... I, 425; III, 2090
- Camden County, N. J., bridge of .... I, 662
- Camden, Gloucester and Woodbury Railway Company, bridge of .... I, 666
- Camden, N. J.:
  - Bridge across Cooper Creek at Browning road .... I, 662
  - Defenses of Delaware River .... I, 6, 21, 37, 770
  - Improvement of Cooper Creek .... I, 239; II, 1329
  - Improvement of Delaware River at .... I, 230; II, 1310
- Canadian canal, St. Marys River, Ontario, commerce through .... I, 565; IV, 3173
- Canals, etc. (*see also* Waterways):
  - Albemarle and Chesapeake Canal, N. C., waterway via .... I, 297; II, 1457
  - Allegheny River, Pa., locks and dams .... I, 482; IV, 2701
  - Appropriation for operation, care, and maintenance .... I, 117, 118
  - Arkansas River, locks and dams .... I, 433; III, 2128
  - Atlantic Ocean to Great Lakes, waterways .... I, 118
  - Barren River, Ky., lock and dam .... I, 503; IV, 2806
  - Benton Harbor Canal, Mich. (*see* St. Joseph Harbor) .... I, 537; IV, 3079
  - Big Barren River, Ky., lock and dam .... I, 503; IV, 2806
  - Big Sandy River, locks and dams .... I, 490, 492, 496; IV, 2735, 2741, 2750
  - Big Sioux River, S. Dak., examination for reservoir dam .... I, 458; III, 2395
  - Big Stone Lake, Minn. and S. Dak., reservoir dam .... I, 450; III, 2342
  - Black Warrior River, locks and dams .. I, 365, 366, 378; III, 1816, 1819, 1824, 1858
  - Brazos River, Tex., locks and dams .... I, 411; III, 1974, 2004, 2009
  - Canadian canal, St. Marys River, Ontario, commerce .... I, 565; IV, 3173
  - Care, maintenance, etc., appropriation for .... I, 117, 118
  - Cascades Canal, Columbia River, Oreg .... I, 626, 627; V, 3492, 3495
  - Chicago Drainage Canal, connection of Chicago River with .... I, 119; IV, 2992
  - Chicago Drainage Canal, waterway via (act of 1899) .... I, 534; IV, 3048
  - Chicago Drainage Canal, waterway via (act of 1900) .... I, 534; IV, 3058
  - Chicago River, bridge across North Branch Canal at Division street, Chicago, construction of .... I, 666
  - Chicago River, bridge across North Branch Canal at Division street, Chicago, reconstruction of .... I, 662
  - Chicago River, bridge across North Branch Canal at Goose Island, Chicago .... I, 665
  - Clubfoot and Harlowe Canal, N. C., waterway via .... I, 303; II, 1493

Canals, etc.—Continued.

- Columbia River, Cascades Canal ... I, 626, 627; V, 3492, 3495
- Columbia River, Celilo Falls to The Dalles Rapids, canals and locks ... I, 629; V, 3501, 3505
- Congaree River, S. C., lock and dam ... I, 319; II, 1594
- Coosa River, Ga. and Ala., locks and dams ... I, 361, 363; III, 1788, 1790, 1792
- Courtableau Bayou, La., lock and dam ... I, 389; III, 1898
- Cumberland River, Tenn. and Ky., locks and dams ... I, 461, 462; III, 2407, 2411
- Davis Island dam, Ohio River, Pa ... I, 473; IV, 2657
- Delaware and Chesapeake Canal, Md., sunken logs ... I, 272; II, 1390
- Des Moines Rapids Canal and dry dock, Mississippi River ... I, 441; III, 2284
- Dismal Swamp Canal, examination and survey from South Mills to and including Ocracoke and Beaufort inlets ... I, 299, 309; II, 1511
- Dismal Swamp Canal, improvement of waterway via ... I, 296; II, 1455
- Duluth Canal, Wis., improvement of ... I, 507; IV, 2828
- Estherville-Minim Creek Canal, S. C. (*see* Santee River) ... I, 316; II, 1587
- Fox River, bridge across canal at Appleton ... I, 664
- Fox River, bridge across canal at Depere ... I, 668
- Fox River, bridge across canal at Lock 2, Kaukauna, reconstruction of. I, 662
- Fox River, bridges obstructing canal at Lawe street and Wisconsin avenue, Kaukauna, alteration of ... I, 668
- Fox River, bridges across canal at Menasha ... I, 668
- Fox River, locks and dams ... I, 525, 527; IV, 2953, 2958
- Galena River, Ill., lock and dam ... I, 442; III, 2293
- Grand Rapids lock and dam, Wabash River ... I, 500, 501; IV, 2800, 2802
- Great Kanawha River, W. Va., locks and dams ... I, 487, 488; IV, 2726, 2727
- Great Lakes to Atlantic Ocean, waterways ... I, 118
- Green River, Ky., locks and dams ... I, 502, 503; IV, 2805, 2806
- Gowanus Canal, N. Y. (*see* Gowanus Bay) ... I, 226; II, 1291
- Herr Island lock and dam, Allegheny River ... I, 482; IV, 2701
- Illinois and Michigan Canal, waterway via (act of 1899) ... I, 534; IV, 3048
- Illinois and Michigan Canal, waterway via (act of 1900) ... I, 534; IV, 3058
- Illinois and Mississippi Canal, construction of ... I, 532; IV, 3014
- Illinois and Mississippi Canal, lock and dam in Rock River at feeder. I, 534; IV, 3066
- Illinois and Mississippi Canal, operating and care ... I, 442; III, 2291
- Illinois River, Ill., locks and dams ... I, 531; IV, 3006, 3010
- Kampeska Lake, S. Dak., reservoir dam in Sioux River ... I, 458; III, 2395
- Kampsville lock and dam, Illinois River, Ill ... I, 531; IV, 3006, 3010
- Kanawha River, W. Va., locks and dams ... I, 487, 488; IV, 2726, 2727
- Kentucky River, Ky., locks and dams ... I, 494, 495; IV, 2744, 2746
- Keweenaw Bay to Lake Superior, waterway ... I, 511, 512; IV, 2867
- Lagrange lock and dam, Illinois River, Ill ... I, 531; IV, 3006, 3010
- Levisa Fork, Big Sandy River, locks and dams ... I, 496; IV, 2750
- Little Kanawha River, W. Va., lock and dam ... I, 486, 487; IV, 2723, 2724
- Long Prairie River, Minn., and its sources, examination for reservoir dams ... I, 451; III, 2361
- Louisville and Portland Canal, improvement and care ... I, 496, 499; IV, 2783, 2791
- Louisville and Portland Canal, wreck ... I, 505; IV, 2816
- Maintenance, care, etc., appropriation for ... I, 117, 118
- Massena Canal, N. Y. (*see* Grass *and* St. Lawrence rivers) ... I, 599; IV, 3377, 3389
- Michigan Lake to Sturgeon Bay, examination and survey ... I, 527; IV, 2970, 2973
- Michigan Lake to Sturgeon Bay, harbor of refuge ... I, 518; IV, 2922
- Michigan Lake to Sturgeon Bay, improvement of ... I, 517; IV, 2914
- Michigan Lake to Sturgeon Bay, operating and care ... I, 518; IV, 2919
- Michigan Lake to Sturgeon Bay, wreck ... I, 527; IV, 2970
- Minim Creek-Estherville Canal, S. C. (*see* Santee River) ... I, 316; II, 1587
- Mississippi River, Des Moines Rapids Canal and dry dock ... I, 441; III, 2284
- Mississippi River, reservoirs, construction of ... I, 444; III, 2309
- Mississippi River, reservoirs, examination of Long Prairie River and its sources ... I, 451; III, 2361
- Mississippi River, reservoirs, operating and care ... I, 445; III, 2322
- Mississippi River, reservoirs, survey of flowage lines ... I, 451
- Mississippi River, St. Paul to Minneapolis, locks and dams ... I, 443; III, 2298
- Mississippi River to Illinois River, construction of ... I, 532; IV, 3014
- Mississippi River to Illinois River, lock and dam in Rock River at feeder ... I, 534; IV, 3066
- Mississippi River to Illinois River, operating and care ... I, 442; III, 2291

Canals, etc.—Continued.
- Monongahela River, locks and dams.......... I, 477, 478, 479; IV, 2679, 2683, 2686
- Morgan Canal, Tex., improvement of (*see* Galveston ship channel). I, 404; III, 1933
- Morgan Canal, Tex., operating and care.......... I, 405; III, 1937
- Mosquito Creek Canal, S. C. (*see* Santee River).......... I, 316; II, 1587
- Muscle Shoals Canal, Ala.......... I, 465, 466; III, 2423, 2440
- Muskingum River, bridge across canal, above Lowell.......... I, 660
- Muskingum River, bridge across canal, at Zanesville.......... I, 667
- Muskingum River, locks and dams.......... I, 485; IV, 2714
- New York Harbor, N. Y., Gowanus Canal (*see* Gowanus Bay).... I, 226; II, 1291
- North Branch Canal, Chicago River, bridge at Division street, Chicago, construction of.......... I, 666
- North Branch Canal, Chicago River, bridge at Division street, Chicago, reconstruction of.......... I, 662
- North Branch Canal, Chicago River, bridge at Goose Island, Chicago... I, 665
- North Carolina Cut, N. C., waterway via.......... I, 297; II, 1457
- Northern and Northwestern Lakes to Atlantic Ocean, waterways.......... I, 118
- Ohio River, Davis Island dam, Pa.......... I, 473; IV, 2657
- Ohio River, Louisville and Portland Canal, improvement and care.......... I, 496, 499; IV, 2783, 2791
- Ohio River, Louisville and Portland Canal, wreck.......... I, 505; IV, 2816
- Ohio River, movable dams.......... I, 474; IV, 2661
- Operation, care, and maintenance, appropriation for.......... I, 117, 118
- Osage River, lock and dam, construction of (*see* Missouri River Commission).......... I, 658; S., 365, 382
- Osage River, lock and dam, cost of completion.......... I, 452; III, 2369
- Otter Tail Lake and River, Minn., reservoir dam.......... I, 450; III, 2341
- Plaquemine Bayou, La., lock construction.......... I, 387; III, 1890
- Poinsett Lake, S. Dak., reservoir dam in Sioux River.......... I, 458; III, 2395
- Portage Lake and Lake Superior canals (*see* Keweenaw Point).......... I, 511, 512; IV, 2867
- Puget Sound to lakes Union and Washington.......... I, 646; V, 3583
- Red Lake and Red Lake River, Minn., reservoir dam.......... I, 450 III, 2340
- Rock River, Ill., canal around, construction of.......... I, 532; IV, 3014
- Rock River, Ill., canal around, operating and care.......... I, 442; III, 2291
- Rock River, Ill., lock and dam at feeder.......... I, 534; IV, 3066
- Rough River, Ky., lock and dam.......... I, 504; IV, 2814, 2815
- St. Clair Flats Canal, examination and survey.......... I, 571; IV, 3203, 3206
- St. Clair Flats Canal, improvement and care.......... I, 568; IV, 3188, 3189
- St. Lawrence Power Company's canal (*see* Grass *and* St. Lawrence rivers).......... I, 599; IV, 3377, 3389
- St. Marys Falls Canal, Mich.......... I, 564, 565; IV, 3161, 3173
- Salmon Bay, Wash., waterway via.......... I, 646; V, 3583
- Shilshole Bay, Wash., waterway via.......... I, 646; V, 3583
- Sioux River, S. Dak., examination for reservoir dam.......... I, 458; III, 2395
- Six-mile Island, Allegheny River, lock and dam.......... I, 482; IV, 2701
- Springdale, Pa., lock and dam in Allegheny River.......... I, 482; IV, 2701
- Sturgeon Bay and Lake Michigan Canal, examination and survey.......... I, 527; IV, 2970, 2973
- Sturgeon Bay and Lake Michigan Canal, harbor of refuge.......... I, 518; IV, 2922
- Sturgeon Bay and Lake Michigan Canal, improvement of.......... I, 517; IV, 2914
- Sturgeon Bay and Lake Michigan Canal, operating and care.... I, 518; IV, 2919
- Sturgeon Bay and Lake Michigan Canal, wreck.......... I, 527; IV, 2970
- Superior Lake to Keweenaw Bay, waterway.......... I, 511, 512; IV, 2867
- Tennessee River below Chattanooga, canals, etc.......... I, 465, 466; III, 2423, 2440
- Tennessee River, Muscle Shoals Canal, Ala.......... I, 465, 466; III, 2423, 2440
- Tombigbee River, Ala., locks and dams.......... I, 366, 378; III, 1824, 1835, 1858
- Traverse Lake, Minn. and S. Dak., reservoir dam.......... I, 450; III, 2342
- Tug Fork, Big Sandy River, locks and dams.......... I, 496; IV, 2750
- Turners Cut, N. C., examination and survey of waterway from South Mills to and including Ocracoke and Beaufort inlets, via... I, 299, 309; II, 1511
- Turners Cut, N. C., improvement of waterway via.......... I, 296; II, 1455
- Union Lake, Wash., waterway via.......... I, 646; V, 3583
- Wabash River, Grand Rapids lock and dam.......... I, 500, 501; IV, 2800, 2802
- Warrior River locks and dams.......... I, 365, 366, 378; III, 1816, 1819, 1824, 1858
- Washington Lake to Puget Sound, Wash.......... I, 646; V, 3583
- White River, Ark., locks and dams.......... I, 428; III, 2108
- Yamhill River, Oreg., lock and dam.......... I, 631, 632; V, 3550, 3555

Canarsie Bay, N. Y., improvement of.......... I, 208; II, 1218

Cape Ann, Mass., construction of harbor of refuge in Sandy Bay ..... I, 141; II, 1048
Cape Charles City Harbor, Va., improvement of ..... I, 294; II, 1453
Cape Elizabeth, Me., bridge of town of ..... I, 668
Cape Fear River, N. C.:
  Defenses of Wilmington ..... I, 6, 24, 812, 921
  Examination and survey at Wilmington, and thence to Fayetteville ..... I, 310; II, 1552, 1557
  Harbor lines at Southport ..... I, 119; II, 1572
  Improvement above Wilmington ..... I, 307; II, 1502
  Improvement at and below Wilmington ..... I, 307; II, 1504
  Improvement of Northeast Branch ..... I, 306; II, 1500
Cape Henry, Va., defenses at ..... I, 6
Cape Porpoise Harbor, Me., improvement of ..... I, 135; II, 1037
Cape Vincent Harbor, N. Y., improvement of ..... I, 597; IV, 3370
Capitol, Washington, D. C., telegraph line ..... I, 676; V, 3689
Carlos Lake, Minn. (*see* Long Prairie River) ..... I, 451; III, 2361
Carrabelle Bar and Harbor, Fla.:
  Examination and survey of harbor ..... I, 364; III, 1800, 1803
  Improvement of ..... I, 350; III, 1766
Carriages, gun:
  Barbette ..... I, 8, 9
  Disappearing ..... I, 6, 8
Carrollton, Ky., bridge across Kentucky River at ..... I, 662
Carrollton and Prestonville Bridge Company, bridge of ..... I, 662
Carrollton Electric Railway and Bridge Company (*see* Carrollton and Prestonville Bridge Company) ..... I, 662
Caruthersville Harbor, Mo. (*see* Mississippi River Commission) ..... I, 657; S., 3, 32
Carvers Harbor, Me., improvement of ..... I, 129; II, 1003
Cascades Canal, Columbia River, Oreg.:
  Construction of ..... I, 626; V, 3492
  Operating and care ..... I, 627; V, 3495
Casemates ..... I, 7, 12, 38
Cedar Creek, N. J., removal of wreck ..... I, 263; II, 1352
Centennial Lake, Miss. (*see* Yazoo River) ..... I, 421; III, 2052
Champlain Lake, N. Y. and Vt.:
  Burlington Harbor, Vt., estimate of cost of repair and completion of breakwater ..... I, 150; II, 1072
  Burlington Harbor, Vt., improvement of ..... I, 146; II, 1052
  Defenses of ..... I, 6, 32, 854
  Narrows, improvement of ..... I, 148; II, 1055
  North and South Hero islands, improvement of channel between ..... I, 146
Charles River, Mass. *See* Boston Harbor.
Charleston Harbor, S. C.:
  Defenses of ..... I, 6, 25, 816
  Improvement of ..... I, 320; II, 1598
  Removal of sunken logs in waterway to Beaufort, S. C ..... I, 324; II, 1607
Charlevoix Harbor, Mich.:
  Bridge across Pine River ..... I, 665
  Bridge across South Arm of Pine Lake ..... I, 666
  Improvement of ..... I, 552; IV, 3126
Charlotte Harbor, Fla., improvement of ..... I, 343; III, 1752
Charlotte Harbor, N. Y.:
  Improvement of ..... I, 593; IV, 3355
  Water levels ..... I, 681; V, 3776
Charts:
  Military and other ..... I, 683, 685; V, 3799
  Northern and Northwestern Lakes ..... I, 677, 681; V, 3761
Chatham Harbor, Mass.:
  Improvement of ..... I, 158; II, 1090
  Removal of wreck on Hardings Beach ..... I, 174; II, 1147
Chattahoochee River, Ga. and Ala.:
  Improvement below Columbus, Ga ..... I, 355; III, 1775
  Improvement between Westpoint and Franklin, Ga ..... I, 356; III, 1777
  Preliminary report on survey between Westpoint and Franklin, Ga ..... I, 363; III, 1793
Cheboygan Harbor, Mich., improvement of ..... I, 554; IV, 3135
Chefuncte River, La., improvement of ..... I, 379; III, 1872
Chehalis River, Wash., improvement of ..... I, 644; V, 3580

- Chelsea Creek and Harbor, Mass.:
  - Bridge to Boston ........ I, 662
  - Improvement of creek (*see* Boston Harbor) ........ I, 152; II, 1078
- Chequamegon Bay, Wis. (*see* Ashland Harbor) ........ I, 509; IV, 2863
- Chesapeake Bay, Md. and Va.:
  - Bridge across Kent Island Narrows, at Kent Island ........ I, 665
  - Cape Charles City Harbor, Va., improvement of ........ I, 294; II, 1453
  - Defenses of entrance, at Cape Henry, Va ........ I, 6
  - Defenses of Hampton Roads, Va ........ I, 6, 23, 802
  - Milford Haven Harbor, Va., improvement of ........ I, 284; II, 1415
  - Waterway from Norfolk, Va., to Albemarle Sound, N. C., via Currituck Sound, improvement of ........ I, 297; II, 1457
  - Waterway from Norfolk, Va., to sounds of North Carolina, via Pasquotank River, improvement of ........ I, 296; II, 1455
  - Wreck near Craighill Channel light, Md., removal of ........ I, 272; II, 1391
  - Wreck near Old Plantation light-house, Va., removal of ........ I, 298; II, 1462
  - Wreck off Fort Monroe, Va., removal of ........ I, 298; II, 1462
- Chesapeake Transit Company, bridge of ........ I, 665
- Chesconnessex Creek, Va., examination and survey ........ I, 299; II, 1478, 1481
- Chester Creek, Pa., removal of wreck ........ I, 262; II, 1350
- Chester River, Md., improvement of ........ I, 267; II, 1381
- Chicago and Northwestern Railway Company, bridge of ........ I, 662
- Chicago Drainage Canal, Ill.:
  - Connection of Chicago River with ........ I, 119; IV, 2992
  - Waterway from Mississippi River to Lake Michigan, via, examination for, with plan and estimate (act of 1900) ........ I, 534; IV, 3058
  - Waterway from Mississippi River to Lake Michigan, via, survey for (act of 1899) ........ I, 534; IV, 3048
- Chicago Harbor and River, Ill.:
  - Bridge across Little Calumet River at Riverdale ........ I, 664
  - Bridge across North Branch at Clybourn place ........ I, 663
  - Bridge across North Branch Canal at Division street, construction of ........ I, 666
  - Bridge across North Branch Canal at Division street, reconstruction of ........ I, 662
  - Bridge across North Branch Canal at Goose Island ........ I, 665
  - Bridge across West Fork of South Branch at Mud Lake ........ I, 663
  - Bridges of Sanitary District at Harrison and Throop streets and Ashland avenue ........ I, 662
  - Improvement of Calumet (South Chicago) Harbor ........ I, 529; IV, 2995
  - Improvement of channels in waters connecting Great Lakes ........ I, 563; IV, 3157
  - Improvement of outer harbor ........ I, 528; IV, 2987
  - Improvement of river ........ I, 529; IV, 2992
  - Waterway from Mississippi River to Lake Michigan at, examination for, with plan and estimate (act of 1900) ........ I, 534; IV, 3058
  - Waterway from Mississippi River to Lake Michigan at, survey for (act of 1899) ........ I, 534; IV, 3048
- Chicago, Milwaukee and St. Paul Railway Company:
  - Bridge of, across Mississippi River, near Minneapolis, Minn ........ I, 662
  - Bridge of, across North Branch Canal, Chicago, Ill ........ I, 665
- Chickasahay River, Miss., improvement of ........ I, 372; III, 1844
- Chief of Engineers, officers on duty in Office of the ........ I, 688
- Chincoteague Bay, Va., improvement of waterway to Delaware Bay ........ I, 260; II, 1348
- Chipola River, Fla.:
  - Improvement of lower river ........ I, 352; III, 1769
  - Improvement of upper river ........ I, 353; III, 1771
- Chippewa River, Wis., improvement of ........ I, 445; III, 2327
- Chitto, Bogue, La., improvement of ........ I, 377; III, 1852
- Choctawhatchee River, Fla. and Ala., improvement of ........ I, 357; III, 1778
- Choptank River, Md.:
  - Improvement of ........ I, 267; II, 1381
  - Removal of wrecks in Cambridge Harbor ........ I, 272; II, 1390, 1391
- Christiana River, Del. (*see* Wilmington Harbor) ........ I, 246; II, 1335
- *City of New Orleans* (steamboat), removal of wreck of ........ I, 473; IV, 2646
- City Waterway, Tacoma, Wash. (*see* Tacoma) ........ I, 655; V, 3593, 3595
- Civilian assistants to engineer officers ........ I, 37, 38
- Clark Fork, Columbia River, Wash. (*see* Pend Oreille River) ........ I, 653; V, 3591
- Clarke County, Wash., bridge of ........ I, 661
- Clatskanie River, Oreg.:
  - Dredging plant for use on (*see* Columbia River) ........ I, 640; V, 3575
  - Improvement of ........ I, 637; V, 3571

- **Clearwater** River, Idaho, improvement of .... I, 628; V, 3501
- Cleveland, Cincinnati, Chicago and St. Louis Railway Company:
  - Bridge of, across Cuyahoga River at Cleveland, Ohio .... I, 663
  - Bridge of, across Pawpaw River, Mich .... I, 668
- *Cleveland, Grover* (schooner), removal of wreck of .... I, 229; II, 1299
- Cleveland Harbor Ohio:
  - Bridge across Cuyahoga River at .... I, 663
  - Engineering methods used in improvement of .... IV, 3213
  - Examination and survey .... I, 585; IV, 3277, 3285
  - Improvement of .... I, 578; IV, 3244
  - Removal of wrecks .... I, 584; IV, 3269, 3270
  - Water levels .... I, 681; V, 3776
- Cleveland, Ohio, engineer district, engineering methods used in the .... IV, 3213
- Clinch River, Tenn.:
  - Bridge at Kingston .... I, 660
  - Final report on survey .... I, 469; III, 2542
  - Improvement of .... I, 468; III, 2455
- Clinton River, Mich., improvement of .... I, 561; IV, 3153
- Clubfoot and Harlowe Canal, N. C., waterway via .... I, 303; II, 1493
- Clubfoot Creek, N. C., improvement of waterway via .... I, 303; II, 1493
- Coanjock Bay, N. C., improvement of waterway via .... I, 297; II, 1457
- Cocheco River, N. H., improvement of .... I, 135; II, 1039
- *Coleman, A. T.* (schooner), removal of wreck of .... I, 262; II, 1351
- College Point, East River, N. Y., harbor lines .... I, 119; II, 1305
- *Colon, Cristobal* (steamboat), removal of wreck of .... I, 657; V, 3635
- Colorado River, Nev., examination between El Dorado Canyon and Rioville .... I, 603; IV, 3402
- *Columbia* (bugeye), removal of wreck of .... I, 272; II, 1390
- Columbia, department of the, reconnaissances and explorations .... I, 683; V, 3799
- Columbia River, Oreg. and Wash.:
  - Dredging plant for use on tributaries below Willamette River .... I, 640; V, 3575
  - Cascades Canal, construction of .... I, 626; V, 3492
  - Cascades Canal, operating and care .... I, 627; V, 3495
  - Celilo, Oreg., improvement above .... I, 623; V, 3489
  - Celilo Falls to The Dalles Rapids, boat railway .... I, 625; V, 3491
  - Celilo Falls to The Dalles Rapids, examination and survey .. I, 629; V, 3501, 3505
  - Clark Fork (*see* Pend Oreille River) .... I, 653; V, 3591
  - Gauging .... I, 640; V, 3576
  - Mouth of, defenses at .... I, 6, 34, 895, 923
  - Mouth of, improvement at .... I, 635; V, 3567
  - Mouth of, to Willamette River, improvement from .... I, 633; V, 3557
  - Three-mile Rapids, improvement at .... I, 625; V, 3491
  - Tongue Point, Oreg., improvement below .... I, 634; V, 3565
  - Vancouver, Wash., to Willamette River, improvement from .... I, 627; V, 3499
- *Comer B.* (steamboat), removal of wreck of .... I, 473; IV, 2646
- Commencement Bay, Wash. (*see* Tacoma Harbor) .... I, 655; V, 3593, 3595
- Commercial statistics, Sault Ste. Marie canals, Mich .... I, 565; IV, 3173
- Communipaw Channel, N. J., removal of wreck in .... I, 223; II, 1247
- Compton Creek, N. J., improvement of .... I, 220; II, 1242
- Conecuh River, Ala., improvement of .... I, 360; III, 1784
- Congaree River, S. C.:
  - Improvement of .... I, 318; II, 1592
  - Improvement between Columbia and Granby .... I, 319; II, 1594
- Congress, Fifty-sixth, second session, acts of, affecting Corps of Engineers .. V, 3837
- Conneaut Harbor, Ohio, improvement of .... I, 582; IV, 3264
- Connecticut, defenses of coast of .... I, 6, 17, 747
- Connecticut River, Conn., improvement of, below Hartford .... I, 180; II, 1166
- Contentnia Creek, N. C., improvement of .... I, 301; II, 1488
- Contingencies of rivers and harbors, estimate of appropriation for .... I, 856
- Continuing contracts .... I, 118
  - Albemarle Sound, N. C., waterway via .... I, 296; II, 1455
  - Allegheny River, Pa., locks and dams .... I, 482; IV, 2701
  - Ambrose Channel, New York Harbor, N. Y .... I, 224; II, 1285
  - Ashtabula Harbor, Ohio .... I, 581; IV, 3260
  - Back Cove, Portland, Me .... I, 131; II, 1006
  - Baltimore Harbor, Md .... I, 264; II, 1374
  - Bay Ridge Channel, New York Harbor, N. Y .... I, 226; II, 1291
  - Big Sandy River, Ky. and W. Va .... I, 490; IV, 2735
  - Black River (Lorain) Harbor, Ohio .... I, 577; IV, 3241

Continuing contracts—Continued.
- Black Rock Harbor, Buffalo, N. Y .......... I, 589; IV, 3324
- Black Warrior River, Ala., below Tuscaloosa .......... I, 366; III, 1825
- Black Warrior River, Ala., from Tuscaloosa to Daniels Creek .... I, 365; III, 1816
- Boston Harbor, Mass .......... I, 152; II, 1078
- Bridgeport Harbor, Conn .......... I, 186; II, 1177
- Buffalo entrance to Erie Basin and Black Rock Harbor, N. Y .... I, 589; IV, 3324
- Buffalo Harbor, N. Y .......... I, 587; IV, 3305
- Calumet Harbor, Ill .......... I, 529; IV, 2995
- Cape Porpoise Harbor, Me .......... I, 135; II, 1037
- Charleston Harbor, S. C .......... I, 320; II, 1598
- Chicago River, Ill .......... I, 529; IV, 2992
- Christiana River, Del .......... I, 246; II, 1335
- Cleveland Harbor, Ohio .......... I, 578; IV, 3244
- Congaree River, S. C .......... I, 319; II, 1594
- Croatan Sound, N. C., waterway via .......... I, 296; II, 1455
- Cumberland River above Nashville, Tenn .......... I, 462; III, 2411
- Cumberland Sound, Ga. and Fla .......... I, 333; II, 1655
- Deep Creek, Va., and waters connecting with Pamlico Sound .... I, 296; II, 1455
- Delaware Bay, Del., harbor of refuge .......... I, 237; II, 1325
- Delaware River, N. J., Pa., and Del .......... I, 230; II, 1310
- Detroit River, Mich .......... I, 569; IV, 3190
- Duluth and Superior Harbor, Minn. and Wis .......... I, 507; IV, 2828
- East (Ambrose) Channel, New York Harbor, N. Y .......... I, 224; II, 1285
- Elizabeth River, Va., to Pamlico Sound, N. C., waterway .......... I, 296; II, 1455
- Erie Basin, Buffalo, N. Y .......... I, 589; IV, 3324
- Everett Harbor, Wash .......... I, 648; V, 3587
- Falls of Ohio River at Louisville, Ky .......... I, 496; IV, 2783
- Galveston Harbor, Tex .......... I, 402; III, 1921
- Gowanus Bay channels, New York Harbor, N. Y .......... I, 226; II, 1291
- Grays Harbor, Wash .......... I, 642; V, 3578
- Great Lakes, channels in connecting waters of .......... I, 563; IV, 3157
- Gulfport, Miss., channel to Ship Island Harbor .......... I, 374; III, 1846
- Hay Lake Channel, St. Marys River, Mich .......... I, 567; IV, 3185
- Horn Island Harbor, Miss .......... I, 371; III, 1842
- Hudson River, N. Y .......... I, 210; II, 1222
- Illinois and Mississippi Canal, Ill .......... I, 532; IV, 3014
- Indiana Chute, Falls of Ohio River, Louisville, Ky .......... I, 496; IV, 2783
- Kenosha Harbor, Wis .......... I, 524; IV, 2945
- Kentucky River, Ky .......... I, 494; IV, 2744
- Keweenaw Bay to Lake Superior, Mich., waterway .......... I, 511; IV, 2867
- Lorain Harbor, Ohio .......... I, 577; IV, 3241
- Loutre, Pass a, Mississippi River .......... I, 383; III, 1878
- Michigan City outer harbor, Ind .......... I, 535; IV, 3075
- Milwaukee Bay, Wis., harbor of refuge .......... I, 522; IV, 2936
- Mississippi River, at Pass a Loutre .......... I, 383; III, 1878
- Mississippi River, Head of Passes to Ohio River .......... I, 657, S., 3, 32
- Mississippi River, between Missouri and Ohio rivers .......... I, 435; III, 2169
- Mississippi River, between Missouri River and St. Paul .......... I, 440; III, 2238
- Mississippi River, between St. Paul and Minneapolis .......... I, 443; III, 2298
- Mississippi River, Vicksburg Harbor, Miss .......... I, 421; III, 2052
- Missouri River, below Sioux City, Iowa .......... I, 658, S., 365, 382
- Mobile Harbor, Ala .......... I, 364; III, 1810
- Monongahela River, W. Va. and Pa .......... I, 477, 478; IV, 2679, 2683
- Narragansett Bay, R. I .......... I, 167; II, 1129
- New Haven Harbor, Conn .......... I, 182; II, 1170
- New York Harbor, N. Y., Ambrose Channel .......... I, 224; II, 1285
- New York Harbor, N. Y., Gowanus Bay channels .......... I, 226; II, 1291
- Norfolk Harbor, Va., to Pamlico Sound, N. C., waterway .......... I, 296; II, 1455
- Northern and Northwestern Lakes, channels connecting .......... I, 563; IV, 3157
- Oakland Harbor, Cal .......... I, 605; IV, 3413
- Ocmulgee River, Ga .......... I, 330, II, 1646
- Ohio River, Falls of, at Louisville, Ky .......... I, 496; IV, 2783
- Ohio River, movable dams .......... I, 474; IV, 2661
- Osage River, Mo .......... I, 658, S., 365, 382
- Pamlico Sound, N. C., waterway to Norfolk Harbor, Va .......... I, 296; II, 1455
- Pascagoula River, Miss .......... I, 371; III, 1842
- Pasquotank River, N. C., waterway via .......... I, 296; II, 1455
- Pass a Loutre, Mississippi River .......... I, 383; III, 1878

**Continuing contracts**—Continued.
Patapsco River, Md. I, 264; II, 1374
Plaquemine Bayou, La. I, 387; III, 1890
Portage Lake harbor of refuge, Mich I, 550; IV, 3119
Portland Harbor, Me., including Back Cove I, 131; II, 1006
Potomac River, below Washington, D. C I, 276; II, 1405
Providence River, R. I I, 167; II, 1129
Racine Harbor, Wis I, 523; IV, 2942
Red Hook Channel, New York Harbor, N. Y I, 226; II, 1291
Rockland Harbor, Me I, 128; II, 1000
Sabine Pass, Tex I, 398; III, 1910
Sacramento River, Cal I, 608; IV, 3420, 3423
St. Joseph Harbor, Mich I, 537; IV, 3079
St. Marys River, Mich., at the falls I, 564; IV, 3161
St. Marys River, Mich., Hay Lake Channel I, 567; IV, 3185
Sandbeach harbor of refuge, Mich I, 557; IV, 3144
San Francisco Harbor, Cal I, 604; IV, 3411
San Pedro Bay, Cal I, 600; IV, 3397
Savannah Harbor, Ga I, 324; II, 1628
Savannah River, Ga., between Augusta and Savannah I, 326; II, 1634
Sheboygan Harbor, Wis I, 521; IV, 2931
Ship channel connecting waters of the Great Lakes I, 563; IV, 3157
Ship Island Harbor, Miss., channel to Gulfport I, 374; III, 1846
South Chicago Harbor, Ill. (*see* Calumet Harbor) I, 529; IV, 2995
Superior Harbor, Wis I, 507; IV, 2828
Superior Lake to Keweenaw Bay, Mich., waterway I, 511; IV, 2867
Tampa Bay, Fla I, 345; III, 1756
Toledo Harbor, Ohio I, 572; IV, 3218
Tombigbee and Warrior rivers, below Tuscaloosa, Ala I, 366; III, 1825
Turners Cut, N. C., waterway via I, 296; II, 1455
Union River, Me I, 124; II, 993
Vicksburg Harbor, Miss I, 421; III, 2052
Warrior River, Ala., below Tuscaloosa I, 366; III, 1825
Warrior River, Ala., from Tuscaloosa to Daniels Creek I, 365; III, 1816
White River (upper), Ark I, 428; III, 2108
Willamette River, above Portland, Oreg I, 631; V, 3550
Wilmington Harbor, Del I, 246; II, 1335
Winyah Bay, S. C. I, 314; II, 1582
Yamhill River, Oreg I, 631; V, 3550
Yazoo River, Miss., at the mouth I, 421; III, 2052
**Contracts, continuing.** *See* Continuing contracts.
***Cook, W. S.*** **(steamer), removal of wreck of** I, 334; II, 1660
**Cooper Creek, N. J.:**
Bridge at Browning road, near Camden I, 662
Improvement of I, 239; II, 1329
**Coos Bay, Harbor, and River, Oreg.:**
Dredging harbor I, 618; V, 3476
Harbor lines in bay I, 119; V, 3544
Improvement of entrance to bay and harbor I, 616; V, 3471
Improvement of river I, 618; V, 3476
**Coosa River, Ga. and Ala.:**
Improvement above East Tenn., Va. and Ga. R. R. bridge I, 361; III, 1788
Improvement below East Tenn., Va. and Ga. R. R. bridge I, 363; III, 1790
Operating and care of locks and dams I, 363; III, 1792
**Coquille River, Oreg.:**
General improvement I, 614; V, 3464
Improvement between Coquille and Myrtle Point I, 615; V, 3468
**Core Sound, N. C., examination and survey of waterway via** I, 299, 309; II, 1511
**Corner Stake light, off Staten Island, N. Y., removal of wreck near** I, 223; II, 1247
**Corps of Artillery:**
Reservation at Willets Point, N. Y., transferred to the I, 42
Tugboat for transfer to the I, 38
**Corps of Engineers:**
Changes in personnel I, 3
Laws of Fifty-sixth Congress, second session, affecting the V, 3837
Number and distribution of officers I, 3, 4
Officers on duty in Office of the Chief of Engineers I, 688
Service of officers in the field, with troops, and as officers of United States volunteers, since April, 1898 I, 45

- Coscob Harbor, Conn., improvement of ..... I, 195; II, 1188
- Courtableau Bayou, La., improvement of ..... I, 389; III, 1898
- Cowlitz River, Wash.:
  - Dredging plant for use on (*see* Columbia River) ..... I, 640; V, 3575
  - Improvement of ..... I, 639; V, 3573
- Coytesville, N. J., harbor lines in Hudson River ..... I, 118; II, 1270
- Craft, sunken. *See* Wrecks.
- *Craig, Pete* (steamer), removal of wreck of ..... I, 334; II, 1660
- Craighill Channel light, Chesapeake Bay, Md., removal of wreck near. I, 272; II, 1391
- Cribs, Kenosha Harbor, Wis., moving of ..... IV, 2948
- *Cristobal Colon* (steamboat), removal of wreck of ..... I, 657; V, 3635
- Croatan Sound, N. C.:
  - Examination and survey of waterway via ..... I, 299, 309; II, 1511
  - Improvement of waterway via ..... I, 296; II, 1455
- Crooked (Carrabelle) River, Fla. *See* Carrabelle Bar and Harbor.
- Crum Creek, Pa., bridge in Delaware County ..... I, 663
- Cumberland River, Tenn. and Ky.:
  - Gauging (*see* Mississippi River) ..... I, 425; III, 2072; S., 8, 45, 126
  - Improvement above Nashville, Tenn ..... I, 462; III, 2411
  - Improvement below Nashville, Tenn ..... I, 461; III, 2407
  - Removal of wreck at Dover Island, below Nashville, Tenn ..... I, 463; III, 2417
- Cumberland Sound, Ga. and Fla.:
  - Defenses of ..... I, 6, 26, 821
  - Engineering methods used in improvement of ..... II, 1660
  - Improvement of ..... I, 333; II, 1655
- *Cumberland* (steamer), removal of wreck of ..... I, 411; III, 1959
- Current River, Ark. and Mo., improvement of ..... I, 431; III, 2124
- Currituck Sound, N. C., improvement of waterway via ..... I, 297; II, 1457
- Curtis Bay, Baltimore, Md.:
  - Estimate of cost of deepening and widening channel of ..... I, 273; II, 1394
  - Improvement of channel to ..... I, 265; II, 1379
- Cut-off, Apalachicola River, Fla., improvement of ..... I, 352; III, 1769
- Cuyahoga River, Ohio:
  - Bridge at Cleveland ..... I, 663
  - Examination and survey of Cleveland Harbor ..... I, 585; IV, 3277, 3285
  - Improvement of Cleveland Harbor ..... I, 578; IV, 3244
  - Removal of wreck in Cleveland Harbor ..... I, 584; IV, 3270
- Cyclone of September, 1900. *See* Hurricane.
- Cypress Bayou, Tex. and La., improvement of ..... I, 414; III, 2033

## D.

- *Daisy* (canal boat), removal of wreck of ..... I, 262; II, 1351
- Dalecarlia Reservoir, Washington Aqueduct, D. C ..... I, 671; V, 3651
- Dams. *See* Canals *and* Waterways.
- Darby Creek, Pa., bridge in Delaware County ..... I, 663
- Dardanelle, Ark. *See* Arkansas River.
- Darien Harbor, Ga., improvement of ..... I, 328; II, 1639
- Darling Lake, Minn. (*see* Long Prairie River) ..... I, 451; III, 2361
- Davis Island dam, Ohio River, Pa., operating and care ..... I, 473; IV, 2657
- Dawson County, Mont., bridge of ..... I, 659
- Dayton, Fla., bridge across Halifax River ..... I, 666
- Deals Island, Tangier Sound, Md., removal of wreck ..... I, 272; II, 1390
- Débris, mining, in California ..... I, 656; V, 3625
- Decatur, Ala., bridge across Tennessee River at ..... I, 662
- Decatur County, Ga., bridge across Flint River in ..... I, 660
- Deep Creek Branch, Elizabeth River, Va., improvement of waterway via ..... I, 296; II, 1455
- *Defender* (steamer), removal of wreck of ..... I, 505; IV, 2816
- Defenses, seacoast. *See* Fortifications.
- Delaware and Chesapeake Canal, Md., removal of sunken logs in Back Creek ..... I, 272; II, 1390
- Delaware and Hudson Company, bridge of ..... I, 669
- Delaware Bay and River, N. J., Pa., and Del.:
  - Bridge at Trenton, N. J ..... I, 661
  - Defenses of ..... I, 6, 21, 37, 770
  - Delaware Breakwater, construction of ..... I, 237; II, 1323
  - Harbor of refuge in bay, construction of ..... I, 237; II, 1325

- Delaware Bay and River, N. J., Pa., and Del.—Continued.
  - Improvement of river, I, 230; II, 1310
  - Lewes, Del., construction of iron pier near, I, 236; II, 1323
  - Marcushook, Pa., improvement of ice harbor, I, 235; II, 1322
  - Waterway to Chincoteague Bay, Va., improvement of, I, 260; II, 1348
  - Wrecks, removal of, I, 262, 263; II, 1350, 1351, 1352
- Delaware Breakwater Harbor, Del.:
  - Construction of breakwater, I, 237; II, 1323
  - Removal of wreck, I, 263; II, 1351
- Delaware County, Pa., bridges across Darby and Crum creeks, I, 663
- Delaware, Fort, Del., defenses at (*see* Delaware River), I, 6, 21, 37, 770
- Delta Point, La. (*see* Mississippi River Commission), I, 657; S., 3, 32
- Dennis Creek, N. J., removal of wreck, I, 262; II, 1350
- Department, Engineer, operations of, in the Philippines, I, 43, 975
- Departments, Executive, Washington, D. C., telegraph line, I, 676; V, 3689
- Departments, military:
  - Operations of Engineer Department in the Philippines, I, 43, 975
  - Reconnaissances and explorations, I, 683; V, 3799
- Depere, Wis., bridge of city of, I, 668
- Depot, Engineer, Willets Point, N. Y, I, 40, 41, 42, 947
- Derelicts. *See* Wrecks.
- Derricks, floating, application of, to grading river banks to receive revetments, III, 2225
- Deschutes River, Wash. (*see* Olympia Harbor), I, 645; V, 3582
- Des Moines Rapids Canal and dry dock, Mississippi River, operation and care, I, 441; III, 2284
- Des Plaines River, Ill.:
  - Waterway from Mississippi River to Lake Michigan via, examination for, with plan and estimate (act of 1900), I, 534; IV, 3058
  - Waterway from Mississippi River to Lake Michigan via, survey for (act of 1899), I, 534; IV, 3048
- Detroit, Mount Clemens and Marine City Railway, bridge of, I, 666
- Detroit River, Mich.:
  - Examination of channel west of Grosse Isle, I, 571; IV, 3208
  - Improvement of, I, 569; IV, 3190
  - Improvement of channels in waters connecting Great Lakes, I, 563; IV, 3157
  - Removal of wreck at Belle Isle, I, 570; IV, 3198
- Disappearing gun carriages, I, 6, 8
- Discharge measurements. *See* Gauging.
- Disk anchor, use of the, III, 2221
- Dismal Swamp Canal, Va. and N. C.:
  - Examination and survey from South Mills to and including Ocracoke and Beaufort inlets, I, 299, 309; II, 1511
  - Improvement of waterway via, I, 296; II, 1455
- District of Columbia. *See* Washington.
- Dividing Creek (La Trappe River), Md., improvement of, I, 268; II, 1382
- Division engineers, I, 119
- Divisions, engineer, I, 119
- Divisions, military:
  - Operations of Engineer Department in the Philippines, I, 43, 975
  - Reconnaisances and explorations, I, 683; V, 3799
- Doboy Bar, Ga., improvement of, I, 327; II, 1638
- *Dodson, Frank* (canal boat), removal of wreck of, I, 262; II, 1350
- Dog Island anchorage, St. George Sound, Fla. *See* Carrabelle Bar and Harbor.
- Dog River, Ala., bridge across, I, 665
- Double Bayou, Tex., improvement of, I, 408; III, 1950
- Douglas, Wis., bridge of town of, across Fox River, I, 664
- Dover Island, Cumberland River, removal of wreck, I, 463; III, 2417
- Dredge boats:
  - For Columbia River tributaries below Willamette River, I, 640; V, 3575
  - For Mississippi River and other waters, I, 383; III, 1878
  - For works in Florida, I, 342; II, 1749
  - For works on Texas coast, I, 408; III, 1950
- Dubuque, Iowa, bridge across Mississippi River near Eagle Point, I, 660
- Dubuque and Wisconsin Bridge Company, bridge of, I, 660
- Duck Creek (Smyrna River), Del.:
  - Examination and survey, I, 263; II, 1361, 1363
  - Improvement of, I, 252; II, 1340
  - Removal of wreck, I, 263; II, 1352

Duck Island Harbor, Conn., construction of harbor of refuge ........ I, 181; II, 1169
Duluth Canal and Harbor, Minn.:
  Improvement of .................................................. I, 507; IV, 2828
  Improvement of channels in waters connecting Great Lakes ...... I, 563; IV, 3157
  Notes on rock found in vicinity of ................................... IV, 2883
  Removal of wreck in harbor ...................................... I, 514; IV, 2883
*Dundee* (schooner), removal of wreck of ............................ I, 584; IV, 3269
Dunkirk Harbor, N. Y., improvement of ............................... I, 586; IV, 3302
Durhams Ferry, San Joaquin River, Cal., bridge across ..................... I, 664
Duwamish River, Wash.:
  Bridge in King County ................................................... I, 663
  Improvement of (*see* Puget Sound) ................................ I, 645; V, 3581
Duxbury Harbor, Mass., improvement of ............................... I, 156; II, 1086
Dyer County, Tenn., bridge of ............................................ I, 667
Dynamite batteries ....................................................... I, 10

E.

Eads, James B., maintenance of South Pass Channel, Mississippi River, by
    representatives of ....................................... I, 118, 379; III, 1865
Eagle Point, Dubuque, Iowa, bridge across Mississippi River near ........... I, 660
East (Ambrose) Channel, New York Harbor, N. Y., improvement of .. I, 224; II, 1285
East Chester Creek, N. Y., improvement of .......................... I, 200; II, 1202
East, department of the, reconnaissances and explorations ......... I, 683; V, 3799
Eastern Branch, Elizabeth River, Va. (*see* Norfolk Harbor) ........ I, 292; II, 1447
East Haddam, Conn., bridge across Salmon River below Leesville .......... I, 662
East River, Ga. (*see* Brunswick Harbor) ............................ I, 331; II, 1649
East River, N. Y.:
  Bridge at Blackwells Island, from Sixtieth street, New York City, to Long
    Island City ........................................................... I, 665
  Bridge at Hell Gate, near Astoria ..................................... I, 664
  Bridge at Little Hell Gate and Bronx Kills ............................ I, 665
  Harbor lines at College Point .................................... I, 119; II, 1305
  Improvement of ................................................... I, 205; II, 1211
  Improvement of Wallabout Channel ................................ I, 208; II, 1218
  Removal of wreck off Greenpoint .................................. I, 223; II, 1248
Ecorse, Mich. (*see* Detroit River) ................................. I, 571; IV, 3208
Ecorse Township, Mich., bridge of, across Rouge River ..................... I, 664
Edenton Bay, N. C., improvement of ................................. I, 297; II, 1460
*Eldridge* (schooner), removal of wreck of .......................... I, 272; II, 1391
Electrical connections, seacoast defenses ............................. I, 13, 37
Elizabeth River, N. J., improvement of .............................. I, 216; II, 1235
Elizabeth River, Va.:
  Bridge across Southern Branch ......................................... I, 665
  Examination and plan and estimate for improvement at Pinner Point,
    Norfolk Harbor ......................................... I, 299; II, 1463, 1466
  Improvement of Norfolk Harbor and its approaches ............... I, 292; II, 1447
  Improvement of waterway to Albemarle Sound, via Currituck
    Sound ......................................................... I, 297; II, 1457
  Improvement of waterway to sounds of North Carolina, via Pasquotank
    River ......................................................... I, 296; II, 1455
  Improvement of Western Branch .................................... I, 293; II, 1449
Elkpoint, S. Dak., improvement of Missouri River at .. I, 452, 454, 455; III, 2373, 2375
Elk River, Tenn. and Ala., improvement of ......................... I, 469; III, 2457
Elk River, W. Va., improvement of ................................. I, 489; IV, 2732
Ellis Island, New York Harbor, N. Y., removal of wrecks near ....... I, 223; II, 1248
Elston Addition, Chicago, Ill., bridge across North Branch Canal, Chicago
    River, at Goose Island ................................................ I, 665
Embankments .............................................................. I, 11, 37
*Emblem* (schooner), removal of wreck of ........................... I, 298; II, 1462
Emplacements ............................................................. I, 8, 9
Employees as civilian assistants to engineer officers ................... I, 37, 38
Endicott Board ........................................................... I, 5
Engineer Department, operations of, in the Philippines .................. I, 43, 975
Engineer Depot, Willets Point, N. Y .............................. I, 40, 41, 42, 947
Engineer divisions ....................................................... I, 119
Engineer equipment of troops ........................................ I, 37, 38, 943

Engineer officers, civilian assistants to ... I, 37, 38
Engineer School ... I, 38, 42, 937
Engineer troops:
  Distribution, duties, etc., of ... I, 39, 41, 42, 943
  Equipment of ... I, 37, 38, 943
Engineering methods:
  Defenses of Boston Harbor, Mass., technical details ... I, 913
  Defenses of mouth of Columbia River, technical details ... I, 923
  Defenses of coast of Maine, technical details ... I, 911
  Defenses of New York Harbor, N. Y., technical details ... I, 917
  Defenses of coast of North Carolina, technical details ... I, 921
  Defenses of San Diego, Cal., technical details ... I, 922
  Duluth, Minn., notes on rock found in vicinity of ... IV, 2883
  Erie Lake, west of Erie, Pa., harbors on ... IV, 3213
  Kenosha Harbor, Wis., moving of cribs at ... IV, 2948
  Mississippi River, between Missouri and Ohio rivers, use of the disk anchor ... III, 2221
  Mississippi River, between Missouri and Ohio rivers, use of lumber mattress for subaqueous bank protection ... III, 2212
  Mississippi River, St. Louis Harbor, Mo., measurement of discharge at, by method of full-depth rod floats ... III, 2199
  Savannah, Ga., engineer district ... II, 1660
  Road scraper and floating derrick, application of the, to grading river banks to receive revetments ... III, 2225
Engineers, Battalion of ... I, 39, 43, 943, 975
Engineers, Chief of, officers on duty in Office of the ... I, 688
Engineers, Corps of:
  Changes in personnel ... I, 3
  Laws of Fifty-sixth Congress, second session, affecting the ... V, 3837
  Number and distribution of officers ... I, 3, 4
  Officers on duty in Office of the Chief of Engineers ... I, 688
  Service of officers in the field, with troops, and as officers of U. S. volunteers, since April, 1898 ... I, 45
Engineers, division ... I, 119
Engineers, The Board of ... I, 5, 691
Equipment, engineer, of troops ... I, 37, 38, 943
Erie Basin, Buffalo, N. Y.:
  Examination and survey of Lake Erie entrance to ... I, 592; IV, 3342, 3345
  Harbor lines ... I, 119; IV, 3349
  Improvement of Buffalo entrance to ... I, 589; IV, 3324
Erie Harbor, Pa.:
  Improvement of ... I, 585; IV, 3295
  Water levels ... I, 681; V, 3776
Erie, Lake:
  *See also* Northern and Northwestern Lakes.
  Engineering methods used at harbors on, west of Erie, Pa ... IV, 3213
  Removal of wreck off Cleveland, Ohio ... I, 584; IV, 3269
  Removal of wreck off Sandusky, Ohio ... I, 584; IV, 3269
  Water levels ... I, 681; V, 3776
Escambia River, Fla., improvement of ... I, 360; III, 1784
Escanaba, Mich., water levels ... I, 681; V, 3776
Esopus Creek, N. Y. (*see* Saugerties Harbor) ... I, 211; II, 1227
Essex River, Mass., improvement of ... I, 141; II, 1047
Estherville-Minim Creek Canal, S. C. (*see* Santee River) ... I, 316; II, 1587
Estimates of appropriations required:
  Fortifications ... I, 37, 38
  River and harbor examinations, surveys, etc ... I, 656
  River and harbor improvements ... I, 118
Eureka, Cal. (*see* Humboldt Harbor) ... I, 611; IV, 3431
Eureka and Klamath River Railroad Company, bridge of ... I, 665
Eureka Slough, Cal., bridge across ... I, 665
Everett Harbor, Wash., improvement of ... I, 648; V, 3587
Examinations:
  Disbursements for surveys and, of waterways between Great Lakes and Atlantic Ocean ... I, 118
  Of rivers and harbors, estimate of appropriation for ... I, 656
Executive Departments, Washington, D. C., telegraph line ... I, 676; V, 3689

**Executive Mansion, Washington, D. C** .... I, 675; V, 3689
**Exeter River, N. H.:**
    **Bridge between Stratham and Newmarket** .... I, 668
    **Improvement of** .... I, 136; II, 1040
**Explorations and reconnaissances, military** .... I, 683; V, 3799

**F.**

**Fairhaven Harbor, Mass. (*see* New Bedford)** .... I, 163; II, 1119
**Fairport Harbor, Ohio, improvement of** .... I, 580; IV, 3255
**Fairy Lake, Tex. and La. (*see* Cypress Bayou)** .... I, 414; III, 2033
**Falia, Bogue, La., improvement of** .... I, 379; III, 1872
**Fall River Harbor, Mass., improvement of** .... I, 169; II, 1134
**Falls of Ohio River, Louisville, Ky.:**
    **Improvement of** .... I, 496; IV, 2783
    **Operating and care of Louisville and Portland Canal** .... I, 499; IV, 2791
**Fayetteville, N. C., examination and survey of Cape Fear River between Wilmington and** .... I, 310; II, 1552, 1557
**Feather River, Cal.:**
    **Improvement of, including report of Board** .... I, 608; IV, 3420, 3423
    **Improvement of, by California Débris Commission** .... I, 656; V, 3625
***Ferd R.* (steamer), wreck of (*see* Yazoo River)** .... I, 420; III, 2048
**Fernandina, Fla.:**
    **Improvement of Cumberland Sound** .... I, 333; II, 1655
    **Improvement of waterway to Savannah, Ga** .... I, 332; II, 1653
*Ferry, E. P.* (tug), removal of wreck of .... I, 514; IV, 2883
Ferry (Fairy) Lake, Tex. and La. (*see* Cypress Bayou) .... I, 414; III, 2033
Field:
    Reconnaissances, explorations, etc., in the .... I, 683; V, 3799
    Service of engineer officers in the, since April, 1898 .... I, 45
Filtration plant, Washington Aqueduct, D. C .... I, 674; V, 3680
Finders, range and position .... I, 10, 37
Finegan Slough, San Joaquin River, Cal., examination for closure of .... I, 613; IV, 3454
Fire Island Inlet, N. Y., examination and survey .... I, 223; II, 1249, 1255
Fish Island, Acushnet River, Mass., bridge between New Bedford and .... I, 665
Fishing Creek, N. C., improvement of .... I, 300; II, 1485
Five-mile River Harbor, Conn., improvement of .... I, 192; II, 1183
Flathead River, Mont., improvement of .... I, 655; V, 3592
Flat Lake, La. (*see* Plaquemine Bayou) .... I, 387; III, 1890
*Fleet Wing* (schooner), removal of wreck of, in Mobile River, Ala .... I, 378; III, 1853
*Fleetwing* (tug), removal of wreck of, in Schuylkill River, Pa .... I, 263; II, 1350
*Flint, May* (ship), removal of wreck of .... I, 613; IV, 3434
Flint River, Ga.:
    Bridge in Decatur County .... I, 660
    Improvement of .... I, 354; III, 1773
    Removal of wreck .... I, 363; III, 1793
Float, rod, full depth, method of discharge measurement .... III, 2199
Floating derricks, application of, to grading river banks to receive revetments .... III, 2225
Florida:
    Defenses of east coast and of Key West .... I, 6, 26, 825
    Defenses of Pensacola .... I, 6, 27, 832
    Defenses of Tampa Bay .... I, 6, 27, 829
    Dredge and snag boat for works in .... I, 342; II, 1749
    Removal of water hyacinths from waters in .... I, 341; II, 1746
Florida East Coast Railway Company, bridge of .... I, 667
Floyd, Sergt. Charles, monument to .... I, 687; V, 3827
Flushing Bay, N. Y., improvement of .... I, 204; II, 1210
*Fontana* (schooner), removal of wreck of .... I, 570; IV, 3198
Fore River, Portland, Me.:
    City (Vaughan) bridge obstructing .... I, 668
    Harbor lines .... I, 118; II, 1027
    Railroad bridge obstructing .... I, 668
Forked Deer River, Tenn., improvement of .... I, 459; III, 2405
Fort Bayou, Miss., bridge across .... I, 666
Fort Benton, Mont., improvement of Missouri River at .... I, 452, 453; III, 2373

- Fort Delaware, Del., defenses at (*see* Delaware River) .... I, 6, 21, 37, 770
- Fortifications:
  - Appropriations made by Congress .... I, 5, 6, 7, 41
  - Appropriations required for 1902–1903, estimates of .... I, 37, 38
  - Board of Engineers, The .... I, 5, 691
  - Board of Ordnance and Fortification .... I, 5
  - Board on Fortifications and other Defenses (Endicott Board) .... I, 5
  - Board on Torpedo System .... I, 5, 695
  - Dynamite batteries .... I, 10
  - Emergency sand batteries .... I, 8
  - General statement, and progress of work .... I, 5
  - Gun and mortar batteries .... I, 5, 7, 37
  - Preservation and repair of .... I, 11, 37
  - Projects .... I, 6, 37
  - Range and position finders .... I, 10, 37
  - Searchlights and electrical connections .... I, 13, 37
  - Sea walls and embankments .... I, 11, 37
  - Sites .... I, 12, 37
  - Submarine mines .... I, 12, 38, 695
  - Supplies for seacoast defenses .... I, 11, 37
  - Technical details, defenses of Boston Harbor, Mass .... I, 913
  - Technical details, defenses of mouth of Columbia River .... I, 923
  - Technical details, defenses of coast of Maine .... I, 911
  - Technical details, defenses of New York Harbor, N. Y .... I, 917
  - Technical details, defenses of coast of North Carolina .... I, 921
  - Technical details, defenses of San Diego, Cal .... I, 922
- Fort McHenry Channel, Baltimore Harbor, Md.:
  - Improvement of .... I, 264; II, 1374
  - Removal of wreck .... I, 272; II, 1391
- Fort Monroe, Va.:
  - Defenses of Hampton Roads .... I, 6, 23, 802
  - Removal of wreck off .... I, 298; II, 1462
- Fort Morgan, Mobile Harbor, Ala., examination and survey of bar below .... I, 378; III, 1854, 1856
- Fort Pierre, S. Dak., improvement of Missouri River at .... I, 452, 454; III, 2373, 2374
- Fort Point Channel, Boston Harbor, Mass.:
  - Bridge at Cove street .... I, 661
  - Improvement of .... I, 152; II, 1078
- Fort Preble, Portland Harbor, Me.:
  - Defenses at .... I, 6, 697, 911
  - Tests of results of firing mortars at .... I, 7
- Fort Smith, Ark. *See* Arkansas River.
- Fort Totten, N. Y., post of .... I, 38, 927
- Fort Washakie, Wyo., road to Buffalo Fork, Snake River .... I, 686; V, 3823
- Fort Wayne Bridge, across Allegheny River, between Pittsburg and Allegheny, Pa .... I, 662
- *Fowler, John* (steamboat), removal of wreck of .... I, 473; IV, 2646
- Fox River, Wis.:
  - Bridge at Appleton .... I, 664
  - Bridge across canal at Depere .... I, 668
  - Bridge across canal at Lock No. 2, Kaukauna, reconstruction of .... I, 662
  - Bridges obstructing canal at Lawe street and Wisconsin avenue, Kaukauna, alteration of .... I, 668
  - Bridge in Marquette County .... I, 664
  - Bridges across canal at Menasha .... I, 668
  - Bridge at Princeton .... I, 663
  - Bridge at Wrightstown .... I, 662
  - Improvement of .... I, 525; IV, 2953
  - Improvement of Green Bay Harbor .... I, 516; IV, 2912
  - Operating and care of locks and dams .... I, 527; IV, 2958
- Foys Flats, Trent River, N. C., examination and survey through .. I, 310; II, 1545, 1550
- Franco Ferry, Fort Bayou, Miss., bridge at .... I, 666
- Frankfort Harbor, Mich., improvement of .... I, 550; IV, 3122
- Franklin, Pa., bridges across Allegheny River at and near .... I, 663
- French Broad River, Tenn., improvement of .... I, 467; III, 2452
- *Friend, Lottie K.* (schooner), removal of wreck of .... I, 263; II, 1350
- Full-depth rod-float method of discharge measurement, illustration of .... III, 2199

## G.

- **Galena River, Ill., operating and care of lock and dam** I, 442; III, 2298
- **Galleries, cable** I, 28
- **Galveston Bay and Harbor, Tex.:**
  - **Defenses of** I, 6, 30, 846
  - **Effects of storm of September, 1900, on fortifications** I, 32, 850
  - **Effects of storm of September, 1900, on jetties and main ship channel** I, 412; III, 2018
  - Examination and survey of harbor from outer end of inner bar to Fifty-first street I, 411; III, 1959, 1967
  - Examination and survey of inner harbor I, 412
  - Improvement of Galveston-Texas City channel I, 403; III, 1930
  - Improvement of harbor I, 402; III, 1921
  - Improvement of waterway to Houston I, 404; III, 1933
  - Improvement of West Bay I, 406, 408; III, 1939, 1950
  - Removal of wrecks I, 411; III, 1959
- Gasconade River, Mo., improvement by Missouri River Commission I, 658; S., 365, 382
- Gauging:
  - Columbia River, Oreg. and Wash I, 640; V, 3576
  - Mississippi River and principal tributaries I, 425; III, 2072; S., 8, 45, 126
  - Mississippi River, at St. Louis, Mo., illustration of full-depth rod-float method of discharge measurement III, 2199
  - Mississippi River, at St. Paul, Minn I, 449; III, 2340
  - Northern and Northwestern Lakes I, 681; V, 3776
- Gauley River, W. Va., improvement of I, 489; IV, 2753
- Gedney Channel, New York Harbor, N. Y., improvement of I, 224; II, 1285
- Genesee River, N. Y. (*see* Charlotte Harbor) I, 593; IV, 3355
- Geneva Lake, Minn. (*see* Long Prairie River) I, 451; III, 2361
- George Lake, St. Johns River, Fla. (*see* Volusia Bar) I, 337; II, 1739
- Georges River, Me., improvement of I, 130; II, 1004
- Georgetown Harbor, S. C., improvement of (*see also* Winyah Bay) I, 314; II, 1581, 1582
- Georgia, defenses of coast of I, 6, 26, 821
- Georgia, Florida and Alabama Railway Company, bridge of I, 660
- Glassport Bridge Company, bridge of I, 661
- Glencove Harbor, N. Y., improvement of I, 204; II, 1209
- Glendive, Mont., bridge across Yellowstone River at I, 659
- Gloucester, Mass., improvement of harbor I, 143; II, 1049
- Gloucester, N. J.:
  - Bridge across Big Timber Creek I, 666
  - Removal of wreck in Delaware River I, 262; II, 1351
- Goose Island, North Branch Canal, Chicago River, Ill., bridge at I, 665
- Goshen Creek, N. J., improvement of I, 245; II, 1334
- Government Printing Office, Washington, D. C.:
  - Construction of building for use of I, 685; V, 3501
  - Telegraph line I, 676; V, 3689
- Governors Island, New York Harbor, N. Y., enlargement of I, 228; II, 1298
- Gowanus Bay, Canal, and Creek, N. Y.:
  - Bay Ridge, Red Hook, and Buttermilk channels, improvement of I, 226; II, 1291
  - Gowanus Canal (*see* Gowanus Bay) I, 226; II, 1291
  - Gowanus Creek Channel, improvement of I, 227; II, 1296
- Grading river banks to receive revetments, application of the road scraper and floating derrick to III, 2225
- Grand Haven Harbor, Mich., improvement of I, 542; IV, 3095
- Grand Lake, La. (*see* Mermentau River) I, 392; III, 1901
- Grand Marais, Mich., improvement of harbor of refuge I, 513; IV, 2880
- Grand Marais, Minn., improvement of harbor I, 505; IV, 2821
- Grand Rapids lock and dam, Wabash River, operating and care I, 501; IV, 2802
- Grand River, La., improvement of I, 387; III, 1890
- Grand River, Mich.:
  - Improvement of I, 544; IV, 3098
  - Improvement of Grand Haven Harbor I, 542; IV, 3095
- Grand River, Ohio (*see* Fairport Harbor) I, 580; IV, 3255
- Granite State Land Company, bridge of I, 666
- Grass River, N. Y., examination and survey I, 599; IV, 3377, 3384

Grays Ferry, Schuylkill River, Philadelphia, Pa., bridge at ... I, 665
Grays Harbor, Wash., improvement of, including bar entrance ... I, 642; V, 3578
Great Kanawha River, W. Va.:
  Improvement of ... I, 487; IV, 2726
  Operating and care of locks and dams ... I, 488; IV, 2727
Great Lakes:
  Commercial statistics, Sault Ste. Marie canals, Mich ... I, 565; IV, 3173
  Defenses of ... I, 32, 854
  Engineering methods used at harbors on Lake Erie west of Erie, Pa ... IV, 3213
  Improvement of channels in waters connecting ... I, 563; IV, 3157
  Notes on rock found in vicinity of Duluth, Minn ... IV, 2883
  Surveys and charts ... I, 677, 681; V, 3761
  Water levels ... I, 681; V, 3776
  Waterways to Atlantic Ocean, disbursements for examinations and surveys ... I, 118
Great Pedee River, S. C.:
  Examination and survey between Cheraw and the Wilmington, Columbia and Augusta Railroad bridge ... I, 324; II, 1607, 1614
  Improvement of ... I, 312; II, 1578
Great Salt Pond, Block Island, R. I., improvement of ... I, 174; II, 1144
Great Sodus Bay, N. Y., improvement of harbor ... I, 594; IV, 3360
Great South Bay, N. Y., examination and survey ... I, 223; II, 1249, 1255
Green Bay, Mich., water levels at Escanaba ... I, 681; V, 3776
Green Bay Harbor, Fox River, Wis., improvement of ... I, 516; IV, 2912
Green Jacket Shoal, Providence River, R. I., removal of ... I, 168; II, 1132
Greenleaf Bend, Mississippi River, Ill., prevention of break into Cache River ... I, 438; III, 2198
Greenpoint, N. Y., removal of wreck in East River off ... I, 223; II, 1248
Green River, Ky.:
  Improvement above mouth of Big Barren River ... I, 502; IV, 2805
  Operating and care of locks and dams ... I, 503; IV, 2806
  Reconstruction of Lock No. 2, at Rumsey ... I, 502; IV, 2805
Greenville Harbor, Miss. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
Greenwich Harbor, Conn., improvement of ... I, 197; II, 1187
Greenwood, Miss., removal of wreck in Yazoo River ... I, 420; III, 2048
Grenada County, Miss., bridge of ... I, 660
Grosse Isle, Detroit River, Mich., examination of channel west of ... I, 571; IV, 3208
Grounds, public buildings and, District of Columbia ... I, 675; V, 3689
Gulfport, Miss., improvement of channel to Ship Island Harbor ... I, 374; III, 1846
Gulf States:
  Removal of water hyacinths from Florida waters ... I, 341; II, 1746
  Removal of water hyacinths from Louisiana waters ... I, 395; III, 1906
Gun batteries ... I, 5, 7, 37
Guttenberg, N. J., harbor lines in Hudson River at ... I, 118; II, 1273
Guyandot River, W. Va., improvement of ... I, 489; IV, 2734

H.

Hackensack River, N. J., bridge across ... I, 665
Halifax River, Fla., bridge across ... I, 666
*Hall, Richard* (schooner), removal of wreck of ... I, 223; II, 1246
Hampton Beach, Me., bridge across Hampton River ... I, 666
Hampton River, Me., bridge across ... I, 666
Hampton Roads, Va.:
  Defenses of ... I, 6, 23, 802
  Improvement of approaches to Norfolk Harbor ... I, 292; II, 1447
  Removal of wreck off Fort Monroe ... I, 298; II, 1462
Hancock, Mich., bridge across Portage Lake between Houghton and ... I, 664
Harbor lines, establishment of ... I, 118
  Allegheny City, Pa ... I, 119; IV, 2709
  Annapolis Harbor, Md ... I, 119; II, 1396
  Arthur Kill, N. J ... I, 118; II, 1279
  Back Cove, Portland, Me ... I, 118; II, 1027
  Bangor Harbor, Me ... I, 118; II, 1022
  Black Rock Harbor, N. Y ... I, 119; IV, 3349
  Bloomers to Pleasant Valley Landing, Hudson River, N. J ... I, 118; II, 1270
  Bronx River, N. Y ... I, 118; II, 1266

- Harbor lines, establishment of—Continued.
  - Buffalo, N. Y., at Erie Basin and Black Rock Harbor .......... I, 119; IV, 3349
  - Byram River, N. Y .......... I, 118; II, 1261
  - Cape Fear River, N. C .......... I, 119; II, 1572
  - College Point, East River, N. Y .......... I, 119; II, 1305
  - Coos Bay, Oreg .......... I, 119; V, 3544
  - East River, at College Point, N. Y .......... I, 119; II, 1305
  - Erie Basin, Buffalo, N. Y .......... I, 119; IV, 3349
  - Fore River, Portland, Me .......... I, 118; II, 1027
  - Guttenberg, N. J .......... I, 118; II, 1273
  - Hillsboro River, Fla .......... I, 119; III, 1763
  - Hudson River, at Guttenberg, N. J .......... I, 118; II, 1273
  - Hudson River, at Troy, N. Y .......... I, 118; II, 1268
  - Hudson River, from Pleasant Valley Landing to Bloomers, N. J .. I, 118; II, 1270
  - Lubec Harbor, Me .......... I, 118; II, 1018
  - Newark Bay, N. J .......... I, 118; II, 1276
  - New Jersey-Staten Island channel (*see* Arthur Kill) .......... I, 118; II, 1279
  - New York Harbor, N. Y., Arthur Kill .......... I, 118; II, 1279
  - New York Harbor, N. Y., Bronx River .......... I, 118; II, 1266
  - New York Harbor, N. Y., at College Point, East River .......... I, 119; II, 1305
  - New York Harbor, N. Y., at Guttenberg, N. J .......... I, 118; II, 1273
  - Niagara River, N. Y., at Erie Basin and Black Rock Harbor .... I, 119; IV, 3349
  - Ohio River, at Allegheny City, Pa .......... I, 119; IV, 2709
  - Pamlico River, N. C .......... I, 119; II, 1570
  - Penobscot River, Me .......... I, 118; II, 1022
  - Pensacola Harbor, Fla .......... I, 119; III, 1806
  - Pittsburg Harbor, Pa., at Allegheny City .......... I, 119; IV, 2709
  - Pleasant Valley Landing to Bloomers, Hudson River, N. J ...... I, 118; II, 1270
  - Port Chester Harbor, N. Y .......... I, 118; II, 1261
  - Portland Harbor, Me .......... I, 118; II, 1027
  - San Francisco Harbor, Cal .......... I, 119; IV, 3460
  - Savannah Harbor, Ga .......... I, 119; II, 1730
  - Seabright, N. J .......... I, 118; II, 1282
  - Severn River, Annapolis, Md .......... I, 119; II, 1396
  - Shrewsbury River, N. J .......... I, 118; II, 1282
  - Southport, N. C .......... I, 119; II, 1572
  - Staten Island-New Jersey channel (*see* Arthur Kill) .......... I, 118; II, 1279
  - Staten Island Sound (Arthur Kill), N. J .......... I, 118; II, 1279
  - Tampa, Fla .......... I, 119; III, 1763
  - Troy, N. Y .......... I, 118; II, 1268
  - Washington, N. C .......... I, 119; II, 1570
- Harbors and rivers. *See* Engineering methods *and* Rivers and harbors.
- Hardings Beach, Chatham, Mass., removal of wreck on .......... I, 174; II, 1147
- Harlem River, N. Y.:
  - Bridge between One hundred and forty-fifth and One hundred and forty-ninth streets, New York .......... I, 663
  - Improvement of .......... I, 206; II, 1214
- Harlowe Creek, N. C., improvement of waterway via .......... I, 303; II, 1493
- Harrisonville Harbor, Mississippi River, Ill., examination of .......... I, 439; III, 2226
- Hartford, Conn., improvement of Connecticut River below .......... I, 180; II, 1166
- *Hatch, A. S.* (canal boat), removal of wreck of .......... I, 223; II, 1247
- Hat Slough, Wash. (*see* Puget Sound) .......... I, 645; V, 3581
- Haverstraw, N. Y., removal of wreck in Hudson River off .......... I, 223; II, 1248
- Havre de Grace, Md.:
  - Examination and survey of rocks near harbor entrance ..... I, 273; II, 1392, 1393
  - Improvement of Susquehanna River above and below .......... I, 264; II, 1374
- Hawaiian Islands:
  - Defenses of .......... I, 6
  - Improvement of Pearl Harbor .......... I, 612; IV, 3433
- Hay Lake Channel, St. Marys River, Mich.:
  - Improvement of .......... I, 567; IV, 3185
  - Improvement of channels in waters connecting Great Lakes .... I, 563; IV, 3157
  - Preliminary report on survey .......... I, 570; IV, 3200
- Helena Harbor, Ark. (*see* Mississippi River Commission) .......... I, 657; S., 3, 32
- Hell Gate, East River, N. Y.:
  - Bridge at, near Astoria .......... I, 664
  - Improvement of .......... I, 205; II, 1211
- Hempstead Harbor, N. Y. (*see* Glencove) .......... I, 204; II, 1209

- Hendersons Point, Portsmouth Harbor, N H., examination and survey I, 149; II, 1057, 1062
- Henry, Cape, Va., defenses at I, 6
- Herr Island lock and dam, Allegheny River, Pa., construction of I, 482; IV, 2701
- Hillsboro Bay and River, Fla.:
  - Harbor lines at Tampa I, 119; III, 1763
  - Improvement of I, 347; III, 1758
- Hillsboro County, Fla., bridge of I, 664
- Hills Ferry, San Joaquin River, Cal., bridge at I, 666
- Hiwassee River, Tenn., final report on survey up to the Ocoee I, 469; III, 2458
- Holland Harbor, Mich., improvement of I, 541; IV, 3092
- Holmes River, Fla., improvement of I, 358; III, 1780
- Holston River, Tenn., final report on survey up to Kingsport I, 469; III, 2518
- *Homer B.* (steamboat), removal of wreck of I, 473; IV, 2646
- Homme Dieu, Le, Lake, Minn. (*see* Long Prairie River) I, 451; III, 2361
- Homochitto River, Miss., improvement of I, 401; III, 1914
- Honolulu, Hawaiian Islands, defenses of I, 6
- Hookton, Cal. (*see* Humboldt Harbor) I, 611; IV, 3431
- *Hooper* (schooner), removal of wreck of I, 309; II, 1511
- Hopefield Bend, Mississippi River (*see* Mississippi River Commission) I, 657; S., 3, 32
- Horn Island Harbor, Miss., improvement of I, 371; III, 1842
- Houghton Mich., bridge across Portage Lake between Hancock and I, 664
- Houghton County, Mich., bridge of I, 664
- Housatonic River, Conn., improvement of I, 184; II, 1175
- Houston, Tex., improvement of waterway to Galveston I, 404; III, 1933
- Howard University Reservoir, Washington, D. C., construction of I, 673; V, 3666
- Hudson County, N. J., bridge of I, 665
- Hudson River, N. Y. and N. J.:
  - Bridge across, between Fifty-ninth and Sixtieth streets, New York City I, 659
  - Bridge at Troy, N. Y I, 669
  - Guttenberg, N. J., harbor lines I, 118; II, 1273
  - Haverstraw, N. Y., removal of wreck off I, 223; II, 1248
  - Improvement between Coxsackie and Troy, N. Y I, 210; II, 1222
  - Peekskill Harbor, N. Y., improvement of I, 213; II, 1230
  - Pleasant Valley Landing to Bloomers, N. J., harbor lines I, 118; II, 1270
  - Rondout Harbor, N. Y., improvement of I, 213; II, 1228
  - Saugerties Harbor, N. Y., improvement of I, 211; II, 1227
  - Troy, N. Y., harbor lines I, 118; II, 1268
- Humboldt Harbor and Bay, Cal., improvement of I, 611; IV, 3431
- Huntington Harbor, N. Y., improvement of I, 203; II, 1208
- Huron Harbor, Ohio, improvement of I, 576; IV, 3236
- Huron Lake:
  - *See also* Northern and Northwestern Lakes.
  - Improvement of harbor of refuge at Sandbeach, Mich I, 557; IV, 3144
  - Preliminary report on survey of waters connecting Lake Superior and I, 570; IV, 3200
  - Water levels I, 681; V, 3776
- Hurricane of September, 1900:
  - Brazos River, Tex., damage to jetties I, 412; III, 2022
  - Galveston, Tex., damage to fortifications I, 32, 850
  - Galveston, Tex., damage to jetties and main ship channel I, 412; III, 2018
  - Sabine Pass, Tex., damage at I, 402; III, 1919
- Hyacinths, water:
  - Removal of, from Florida waters I, 341; II, 1746
  - Removal of, from Louisiana waters I, 395; III, 1906
- Hyannis, Mass., improvement of harbor of refuge I, 160; II, 1110
- Hydraulic mining in California I, 656; V, 3625
- Hydraulics. *See* Engineering methods.

## I.

- Iberville Parish, La., bridge of I, 668
- Ida Lake, Minn. (*see* Long Prairie River) I, 451; III, 2361
- Illinois and Michigan Canal, Ill.:
  - Examination, with plan and estimate, for waterway via (act of 1900) I, 534; IV, 3058
  - Survey for waterway via (act of 1899) I, 534; IV, 3048

- Illinois and Mississippi Canal, Ill.:
  - Construction of .... I, 532; IV, 3014
  - Examination for lock and dam in Rock River at feeder .... I, 534; IV, 3066
  - Operating and care .... I, 442; III, 2291
- Illinois Central Railroad Company, bridge of .... I, 664
- Illinois River, Ill.:
  - Improvement of .... I, 531; IV, 3006
  - Operating and care of locks and dams .... I, 531; IV, 3010
  - Waterway from Mississippi River to Lake Michigan via, examination for, with plan and estimate (act of 1900) .... I, 534; IV, 3058
  - Waterway from Mississippi River to Lake Michigan via, survey for (act of 1899) .... I, 534; IV, 3048
- Indian River Bay, Del., improvement of waterway via .... I, 260; II, 1348
- Indian River, Fla., improvement of .... I, 339; II, 1742
- Indian River Inlet, Fla. (*see* Indian River) .... I, 339; II, 1742
- Indiana Chute, Falls of Ohio River, improvement of .... I, 496; IV, 2783
- Indiana, Illinois and Iowa Railroad Company, bridge of .... I, 660
- Inland routes. *See* Canals *and* Waterways.
- Inside Thoroughfare, Atlantic City, N. J., bridge across .... I, 664
- Irene Lake, Minn. (*see* Long Prairie River) .... I, 451; III, 2361
- *Iron State* (barge), removal of wreck of .... I, 262; II, 1351
- Ironton, Ohio, bridge across Ohio River between Ashland, Ky., and .... I, 660
- Island Beach, N. J., removal of wreck in Shrewsbury River opposite. I, 223; II, 1247
- Isle of Wight Bay, Md., improvement of waterway via .... I, 260; II, 1348

## J.

- Jackson County, Miss., bridge of .... I, 666
- Jackson Creek, Md., removal of wreck .... I, 272; II, 1391
- Jamaica Bay, N. Y., bridge across .... I, 663
- James River, Va.:
  - Improvement of .... I, 289; II, 1423
  - Protection of Jamestown Island .... I, 291; II, 1437
- Jamestown Island, James River, Va., protection of .... I, 291; II, 1437
- Jefferson, Pa., bridge across Monongahela River between Port Vue and .... I, 661
- Jefferson, Tex., waterway to Shreveport, La. (*see* Cypress Bayou) ... I, 414; III, 2033
- Jekyl Creek, Ga., improvement of waterway via .... I, 332; II, 1653
- Jersey City, N. J. *See* New York Harbor.
- Johnsons Bayou, La., improvement of .... I, 395; III, 1905
- Johnsons Creek, Conn. (*see* Bridgeport Harbor) .... I, 186; II, 1177
- Judith, Mont., improvement of Missouri River at .... I, 452, 453; III, 2373, 2374
- Judith, Point, R. I.:
  - Construction of harbor of refuge .... I, 171; II, 1138
  - Improvement of pond entrance .... I, 172; II, 1140
- *Jules* (barge), removal of wreck of .... I, 411; III, 1959
- Jupiter Inlet, Fla. (*see* Indian River) .... I, 340; II, 1743

## K.

- Kalamazoo River, Mich., improvement at Saugatuck ..... I, 540, 541; IV, 3087, 3090
- Kampeska Lake, S. Dak. (*see* Sioux River) .... I, 458; III, 2395
- Kampsville lock and dam, Illinois River, Ill., operating and care.... I, 531; IV, 3010
- Kanawha River, W. Va.:
  - Improvement of .... I, 487; IV, 2726
  - Operating and care of locks and dams .... I, 488; IV, 2727
- Kansas City Southern Railway Company, bridge of .... I, 660
- Karquines Strait, Cal., examination and survey of San Joaquin River from Antioch, through Suisun Bay, to .... I, 613; IV, 3449, 3452
- Kaskaskia River, Ill., bridge across .... I, 667
- *Kate* (tug), removal of wreck of .... I, 411; III, 1959
- Kaukauna, Wis.:
  - Bridge across Fox River Canal at Lock No. 2, reconstruction of .... I, 662
  - Bridges obstructing Fox River Canal at Lawe street and Wisconsin avenue, alteration of .... I, 668
- *Kelsy, Percy* (steamboat), removal of wreck of .... I, 473; IV, 2646

Kennebec River, Me.:
  Defenses of .......... I, 6, 14, 697, 698, 911
  Improvement of .......... I, 130; II, 1005
Kenosha Harbor, Wis.:
  Bridge across Pike Creek .......... I, 667
  Improvement of .......... I, 524; IV, 2945
  Moving of cribs at .......... IV, 2948
Kent Island, Chesapeake Bay, Md., bridge across Kent Island Narrows .......... I, 665
Kent Island Narrows, Chesapeake Bay, Md., bridge at Kent Island .......... I, 665
Kentucky River, Ky.:
  Bridge at Carrollton .......... I, 662
  Improvement of .......... I, 494; IV, 2744
  Operating and care of locks and dams .......... I, 495; IV, 2746
Kewaunee Harbor, Wis., improvement of .......... I, 519; IV, 2925
Keweenaw Bay and Point, Mich., improvement and operating and care of waterway to Lake Superior .......... I, 511, 512; IV, 2867
Keyport Harbor, N. J., improvement of .......... I, 220; II, 1241
Key West Harbor, Fla.:
  Defenses of .......... I, 6, 26, 825
  Improvement of .......... I, 340; II, 1744
Kill van Kull, N. Y. and N. J. (*see* Staten Island-New Jersey channel) .......... I, 215; II, 1233
King County, Wash., bridge of .......... I, 663
Kingston, R. I.:
  Construction of Point Judith harbor of refuge .......... I, 171; II, 1138
  Improvement of entrance to Point Judith Pond .......... I, 172; II, 1140
Kingston, Tenn., bridge across Clinch River at .......... I, 660
Kingston Bay, Mass. (*see* Duxbury Harbor) .......... I, 156; II, 1086
Kingston Bridge and Terminal Railway Company, bridge of .......... I, 660
Kinnickinnic River, Wis., examination of Milwaukee Harbor .......... I, 527; IV, 2981
Kissimmee River, Fla., examination and survey to Gulf of Mexico .......... I, 350
Kittery, Me., bridge between Portsmouth Navy-Yard, N. H., and .......... I, 664
Kootenai River, Idaho and Mont.:
  Examination from Jennings to international boundary .......... I, 655; V, 3603
  Improvement from Bonners Ferry to international boundary .......... I, 654; V, 3591

L.

Lacenter, Wash., bridge across Lewis River at .......... I, 661
La Crosse Harbor, Wis., improvement of .......... I, 442; III, 2295
Lafourche Bayou, La., improvement of .......... I, 386; III, 1887
Lagrange Bayou, Fla., improvement of .......... I, 358; III, 1780
Lagrange lock and dam, Illinois River, Ill., operating and care .......... I, 531; IV, 3010
Lanes Ferry, Obion River, Tenn., bridge at .......... I, 667
Larchmont Harbor, N. Y., improvement of .......... I, 199; II, 1201
La Trappe River, Md., improvement of .......... I, 268; II, 1382
*Laura Wilhelmina* (sloop), removal of wreck of .......... I, 272; II, 1390
Laurel, Del., bridge across Broad Creek River at .......... I, 666
Laws of Fifty-sixth Congress, second session, affecting Corps of Engineers .......... V, 3837
*Leader* (schooner), removal of wreck of .......... I, 570; IV, 3198
Leaf River, Miss., improvement of .......... I, 373; III, 1845
League Island Navy-Yard, Pa., removal of wreck in Schuylkill River .......... I, 263; II, 1352
Leech Lake, Minn.:
  Construction of reservoir dam .......... I, 444; III, 2309
  Operating and care of reservoir dam .......... I, 445; III, 2322
  Survey of flowage lines of reservoir .......... I, 451
*Lee, Druzilla B.* (schooner), removal of wreck of .......... I, 262; II, 1350
Lee Slough, Fla. (*see* Apalachicola River) .......... I, 352; III, 1769
Leesville, East Haddam, Conn., bridge across Salmon River below .......... I, 662
Legislation of Fifty-sixth Congress, second session, affecting Corps of Engineers .......... V, 3837
Le Homme Dieu Lake, Minn. (*see* Long Prairie River) .......... I, 451; III, 2361
Lemon Creek, N. Y. (*see* Staten Island-New Jersey channel) .......... I, 215; II, 1233
*Leonard, Jemima* (barge), removal of wreck of .......... I, 223; II, 1247
Levisa Fork, Big Sandy River, Ky.:
  Final report on survey for locks and dams .......... I, 496; IV, 2750
  Improvement of .......... I, 493; IV, 2742

- Lewes, Del.:
  - Construction of iron pier in Delaware Bay near.................. I, 236; II, 1323
  - Improvement of waterway to Chincoteague Bay, Va.............. I, 260; II, 1348
- Lewes River, Del. (*see* Broadkill Creek)............................ I, 260; II, 1347
- Lewes River Improvement Company (*see* Broadkill Creek)........... I, 260; II, 1347
- Lewis River, Wash:
  - Bridge at Lacenter.................................................. I, 661
  - Dredging plant for use on (*see* Columbia River)................. I, 640; V, 3575
  - Improvement of.................................................. I, 638; V, 3572
- Licking River, Ky., survey of.......................................... I, 476; IV, 2670
- Little Assawaman Bay, Del., improvement of waterway via.......... I, 260; II, 1348
- Little Calumet River, Ill.:
  - Bridge at Riverdale.................................................. I, 664
  - Survey for waterway via.................................. I, 534; IV, 3048, 3058
- Little Harbor, N. H., improvement of harbor of refuge.............. I, 137; II, 1041
- Little Hell Gate, New York Harbor, N. Y., bridge across.................. I, 665
- Little Kanawha River, W. Va.:
  - Improvement of.................................................. I, 486; IV, 2723
  - Operating and care of lock and dam.............................. I, 487; IV, 2724
- Little Mud River, Ga., improvement of waterway via............... I, 332; II, 1653
- Little Narragansett Bay, R. I. and Conn. (*see* Pawcatuck River)...... I, 175; II, 1159
- Little Pedee River, S. C., improvement of............................ I, 311; II, 1576
- Little Pigeon River, Tenn., improvement of.......................... I, 467; III, 2454
- Little River, La. (*see* Red River)..................................... I, 412; III, 2025
- Little Rock, Ark. *See* Arkansas River.
- Little Sarasota Bay, Fla. (*see* Sarasota Bay)....................... I, 344; III, 1753
- Little Sodus Bay, N. Y., improvement of harbor..................... I, 595; IV, 3363
- Little Tallahatchie River, Miss. (*see* Tallahatchie).................. I, 422; III, 2067
- Little Tennessee River, Tenn.:
  - Bridge near Niles Ferry.............................................. I, 668
  - Examination and survey up to and including Abrams Creek. I, 469; III, 2491, 2496
- Little Traverse Bay, Mich. (*see* Petoskey Harbor).................... I, 553; IV, 3129
- Locks. *See* Canals *and* Waterways.
- Logan, General, statue of............................................. I, 676; V, 3689
- Long Bridge, Potomac River, D. C., rebuilding of..................... I, 275; II, 1399
- Long Island City, N. Y., bridge across East River to Sixtieth street, New York City.............................................................. I, 665
- Long Island Sound, N. Y.:
  - Defenses of eastern entrance.................................... I, 6, 17, 747
  - Removal of wreck off Port Chester.............................. I, 223; II, 1246
- Long Prairie River, Minn., examination of, and its sources.......... I, 451; III, 2361
- Long Sault Island, St. Lawrence River, N. Y., examination and survey at................................................. I, 599; IV, 3389, 3391
- Long Tom River, Oreg., improvement of.............................. I, 630; V, 3549
- Lorain Harbor, Ohio, improvement of................................ I, 577; IV, 3241
- Louise Lake, Minn. (*see* Long Prairie River)........................ I, 451; III, 2361
- Louisiana, removal of water hyacinths from waters in.............. I, 395; III, 1906
- Louisville, Ky.:
  - Improvement of Ohio River at.................................... I, 496; IV, 2783
  - Operating and care of Louisville and Portland Canal............. I, 499; IV, 2791
  - Removal of wreck in Louisville and Portland Canal............. I, 505; IV, 2816
- Louisville and Nashville Railroad Company, bridge of.................... I, 665
- Louisville and Portland Canal, Ky.:
  - Enlargement of.................................................. I, 496; IV, 2783
  - Operating and care.............................................. I, 499; IV, 2791
  - Removal of wreck................................................ I, 505; IV, 2816
- Loutre, Pass a, Mississippi River, La.:
  - Closing crevasse in.............................................. I, 382; III, 1877
  - Constructing sill across.......................................... I, 383; III, 1878
- Lowell, Ohio, bridge across Muskingum River Canal, above................ I, 660
- Lower Machodoc Creek, Va., improvement of......................... I, 281; II, 1410
- Lubec Channel and Harbor, Me.:
  - Harbor lines..................................................... I, 118; II, 1018
  - Improvement of channel......................................... I, 120; II, 988
- Ludington Harbor, Mich., improvement of............................ I, 548; IV, 3112
- Lumber mattress, use of, for subaqueous bank protection...................... III, 2212
- Lumberton Branch, Rancocas River, N. J., improvement of.......... I, 238; II, 1327

Lynn Harbor, Mass.:
  Examination and survey ........ I, 159; II, 1092, 1093
  Improvement of ........ I, 150; II, 1075
Lynn Haven Inlet, Va., bridge across ........ I, 665
*Lyttee, Ephriam* (sloop), removal of wreck of ........ I, 272; II, 1391

M.

McConnelsville, Ohio, bridge across Muskingum River ........ I, 666
*McDonald, Charley* (steamboat), removal of wreck of ........ I, 473; IV, 2646
*Macedonia* (steamship), removal of wreck of ........ I, 223; II, 1247
Maçon Bayou, La., improvement of ........ I, 419; III, 2046
*Maggie* (schooner), removal of wreck of, in North Point Creek, Patapsco River, Md ........ I, 272; II, 1390
*Maggie* (sloop), removal of wreck of, in Cambridge Harbor, Md ........ I, 272; II, 1391
Mahon (Harbor) River, Del., examination of ........ I, 263; II, 1358
Main Ship Channel, New York Harbor, N. Y., improvement of ........ I, 224; II, 1285
Maine, defenses on coast of ........ I, 6, 7, 13, 697, 911
Malden River, Mass., improvement of ........ I, 151; II, 1077
Mall, the, Washington, D. C., improvement of, including its connection with Potomac and Zoological parks ........ I, 676; V, 3689
Malta, Ohio, bridge across Muskingum River ........ I, 666
Mamaroneck Harbor, N. Y., improvement of ........ I, 199; II, 1200
Manasquan River, N. J., improvement of ........ I, 222; II, 1245
Manatee River, Fla., improvement of ........ I, 345; III, 1755
Manchac Bayou, La., improvement of ........ I, 381; III, 1875
Manchester Harbor, Mass., improvement of ........ I, 144; II, 1051
Mandan, N. Dak., ice harbor in Missouri River near ........ I, 452, 456; III, 2373, 2377
Manhattan Borough, New York City, N. Y. *See* New York Harbor.
Manila, Philippine Islands, report upon work of department of city public works and water supply ........ I, 683, 684
Manistee Harbor, Mich., improvement of ........ I, 549; IV, 3116
Manitowoc Harbor and River, Wis.:
  Bridge to connect State and Center streets ........ I, 662
  Examination for harbor of refuge ........ I, 527; IV, 2978
  Improvement of ........ I, 520; IV, 2928
Manokin River, Md.:
  Improvement of ........ I, 270; II, 1387
  Removal of wreck ........ I, 272; II, 1390
Mantua Creek, N. J., improvement of ........ I, 241; II, 1330
Maps:
  Military and other ........ I, 683, 685; V, 3799
  Northern and Northwestern Lakes ........ I, 677, 681; V, 3761
Marblehead Harbor, Mass., repair of sea wall ........ I, 145; II, 1052
Marcushook, Pa., improvement of ice harbor in Delaware River ........ I, 235; II, 1322
Marietta, Ohio:
  Bridge of Ohio River Bridge and Ferry Company across Ohio River between Williamstown, W. Va., and ........ I, 660
  Bridge of Williamstown and Marietta Bridge and Transportation Company between Williamstown, W. Va., and ........ I, 661
Marinette, Wis. (*see* Menominee Harbor *and* River) ........ I, 515; IV, 2908, 2909
Marion, Mass., bridge across Weweanititt River ........ I, 667
Marquette Bay and Harbor, Mich.:
  Construction of harbor of refuge in bay ........ I, 513; IV, 2879
  Improvement of harbor ........ I, 512; IV, 2877
  Water levels ........ I, 681; V, 3776
Marquette County, Wis., bridge across Fox River in ........ I, 664
Marthas Vineyard, Mass improvement of Vineyard Haven Harbor ........ I, 162; II, 1115
*Martin* (schooner), removal of wreck of ........ I, 570; IV, 3198
Martins Creek, Miss., bridge across Yalobusha River at mouth of ........ I, 660
Mary Lake, Minn. (*see* Long Prairie River) ........ I, 451; III, 2361
*Mascot* (steamer), removal of wreck of ........ I, 363; III, 1793
Massachusetts, State of:
  Bridges of, across Weweanititt River ........ I, 667
  Defenses of southeast coast of ........ I, 6, 16, 735
Massena, N. Y., examination and survey of Grass River up to ........ I, 599; IV, 3377, 3384
Massena Canal, N. Y. (*see* Grass *and* St. Lawrence rivers) ........ I, 599; IV, 3389, 3391
Matanzas River, Fla. (*see* St. Augustine Harbor) ........ I, 338; II, 1741

- Matawan Creek, N. J., improvement of ... I, 219; II, 1240
- Mattaponi River, Va., improvement of ... I, 287; II, 1419
- Mattituck Harbor, N. Y., improvement of ... I, 201; II, 1205
- Mattress, lumber, use of, for subaqueous bank protection ... III, 2212
- Maumee Bay and River, Ohio:
  - Bridges across river, near Toledo ... I, 667
  - Engineering methods used in improvement of ... IV, 3213
  - Improvement of Toledo Harbor ... I, 572; IV, 3218
- Maumee Railway Bridge Company, bridges of ... I, 667
- Maysville, Ky., examination and survey of Ohio River for harbor of refuge (ice harbor) at ... I, 477; IV, 2670, 2675
- *Meadowbrook* (canal boat), removal of wreck of ... I, 263; II, 1352
- Memorial Bridge, across Potomac River at Washington, D. C ... I, 670; V, 3648
- Memphis Harbor, Tenn. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
- Menasha, Wis., bridges of city of ... I, 668
- Menekaunee, Wis. (*see* Menominee Harbor *and* River) ... I, 515; IV, 2908, 2909
- Menominee Harbor and River, Mich. and Wis.:
  - Improvement of harbor ... I, 515; IV, 2908
  - Improvement of river ... I, 515; IV, 2909
- Merced County, Cal., bridge of ... I, 666
- Mermentau River, La., improvement of, including tributaries ... I, 392; III, 1901
- Merrimac River, Mass.:
  - Improvement of ... I, 139; II, 1044
  - Improvement of Newburyport Harbor ... I, 138; II, 1043
- Methods, engineering. *See* Engineering methods.
- Mexico, Gulf of:
  - Removal of water hyacinths from Florida tributaries ... I, 341; II, 1746
  - Removal of water hyacinths from Louisiana tributaries ... I, 395; III, 1906
- *Meyers, Edward L.* (canal boat), removal of wreck of ... I, 262; II, 1352
- Mianus River, Conn., improvement of ... I, 195; II, 1186
- Michigan City Harbor, Ind.:
  - Improvement of inner harbor ... I, 534; IV, 3074
  - Improvement of outer harbor ... I, 534, 535; IV, 3075
- Michigan, Lake:
  - *See also* Northern and Northwestern Lakes.
  - Canal to Sturgeon Bay, construction of harbor of refuge ... I, 518; IV, 2922
  - Canal to Sturgeon Bay, examination and survey ... I, 527; IV, 2970, 2973
  - Canal to Sturgeon Bay, improvement of ... I, 517; IV, 2914
  - Canal to Sturgeon Bay, operating and care ... I, 518; IV, 2919
  - Canal to Sturgeon Bay, removal of wreck ... I, 527; IV, 2970
  - Water levels ... I, 681; V, 3776
  - Waterway to Mississippi River, examination for, with plan and estimate (act of 1900) ... I, 534; IV, 3058
  - Waterway to Mississippi River, survey for (act of 1899) ... I, 534; IV, 3048
- Milan, Ill.:
  - Construction of canal around Rock River at ... I, 532; IV, 3014
  - Operating and care of canal around Rock River at ... I, 442; III, 2291
- Milford Haven Harbor, Va., improvement of ... I, 284; II, 1415
- Military divisions and departments:
  - Operations of Engineer Department in the Philippines ... I, 43, 975
  - Reconnaissances and explorations ... I, 683; V, 3799
- Mill River, New Haven, Conn. (*see* New Haven) ... I, 182; II, 1170
- Mill River, Stamford, Conn. (*see* Stamford) ... I, 194; II, 1184
- Miltona Lake, Minn. (*see* Long Prairie River) ... I, 451; III, 2361
- Milwaukee Bay, Harbor, and River, Wis.:
  - Bridge across river at Chestnut street ... I, 661
  - Construction of harbor of refuge in bay ... I, 522; IV, 2936
  - Examination of harbor ... I, 527; IV, 2981
  - Improvement of harbor ... I, 523; IV, 2939
  - Water levels ... I, 681; V, 3776
- Mina Lake, Minn. (*see* Long Prairie River) ... I, 451; III, 2361
- Mines, submarine ... I, 12, 38, 695
- Minim Creek-Estherville Canal, S. C. (*see* Santee River) ... I, 316; II, 1587
- Mining, hydraulic, in California ... I, 656; V, 3625
- Minneapolis, Minn.:
  - Bridge of Chicago, Milwaukee and St. Paul Railway Company across Mississippi River near ... I, 662
  - Bridges of Wisconsin Central Railway Company at Nicollet and Boom islands near ... I, 667

- **Minnesota River, Minn.:**
  - Improvement of ... I, 447; III, 2334
  - Survey of Big Stone and Traverse lakes for reservoir dams to improve navigation on ... I, 450; III, 2342
- **Mispillion River, Del.:**
  - Examination and survey ... I, 264; II, 1365, 1368
  - Improvement of ... I, 257; II, 1345
- **Mississippi River:**
  - Beechridge, Ill., prevention of break at ... I, 438; III, 2198
  - Boom Island, Minn., bridge at ... I, 667
  - Brainerd, Minn., to Sandy Lake dam, survey from ... I, 451; III, 2343
  - Caruthersville, Mo. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
  - Delta Point, La. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
  - Des Moines Rapids Canal and dry dock, operation and care ... I, 441; III, 2284
  - Dredge and snag boats above Missouri River, operation of ... I, 440; III, 2231
  - Dredge and snag boats below Missouri River, operation of ... I, 434; III, 2166
  - Dredge boats for passes of ... I, 383; III, 1878
  - Dubuque, Iowa, bridge near Eagle Point ... I, 660
  - Eagle Point, Dubuque, Iowa, bridge near ... I, 660
  - Gauging at St. Louis, Mo ... III, 2199
  - Gauging at St. Paul, Minn ... I, 449; III, 2340
  - Gauging, including principal tributaries ... I, 425; III, 2072; S., 8, 45, 126
  - Greenleaf Bend, Ill., prevention of break into Cache River ... I, 438; III, 2198
  - Greenville, Miss. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
  - Harrisonville Harbor, Ill., examination of ... I, 439; III, 2226
  - Head of Passes to headwaters, surveys from ... I, 657; S., 3, 32
  - Head of Passes to Ohio River, improvement, surveys, etc ... I, 657; S., 3, 32
  - Helena, Ark. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
  - Hickman, Ky., to Slough Landing, Tenn., examination and survey ... I, 434; III, 2155, 2158
  - Hopefield Bend (*see* Mississippi River Commission) ... I, 657; S., 3, 32
  - La Crosse Harbor, Wis., improvement of ... I, 442; III, 2295
  - Loutre, Pass a, closing crevasse in ... I, 382; III, 1877
  - Loutre, Pass a, constructing sill across ... I, 383; III, 1878
  - Memphis, Tenn. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
  - Minneapolis, Minn., bridges near ... I, 662, 667
  - Minneapolis, Minn., to St. Paul, improvement from ... I, 443; III, 2298
  - Missouri River, above, operation of snag and dredge boats ... I, 440; III, 2231
  - Missouri River, below, removal of snags and wrecks ... I, 434; III, 2166
  - Missouri River to Ohio River, discharge measurements at St. Louis, Mo. III, 2199
  - Missouri River to Ohio River, disk anchor, use of ... III, 2221
  - Missouri River to Ohio River, improvement from ... I, 435; III, 2169
  - Missouri River to Ohio River, lumber mattress for subaqueous bank protection ... III, 2212
  - Missouri River to St. Paul, Minn., improvement from ... I, 440; III, 2238
  - Natchez, Miss. (*see* Mississippi River Commission) ... I, 657; S., 3, 32
  - New Orleans, La., defenses of ... I, 6, 30, 842
  - New Orleans, La., improvement at, by Mississippi River Commission ... I, 657; S., 3, 32
  - Nicollet Island, Minn., bridges at ... I, 667
  - Ohio River to Head of Passes, improvement, surveys, etc ... I, 657; S., 3, 32
  - Ohio River to Missouri River, discharge measurements at St. Louis, Mo. III, 2199
  - Ohio River to Missouri River, disk anchor, use of ... III, 2221
  - Ohio River to Missouri River, improvement from ... I, 435; III, 2169
  - Ohio River to Missouri River, lumber mattress for subaqueous bank protection ... III, 2212
  - Outlet, improvement of ... I, 383; III, 1878
  - Pass a Loutre, closing crevasse in ... I, 382; III, 1877
  - Pass a Loutre, constructing sill across ... I, 383; III, 1878
  - Passes of, dredge boats for ... I, 383; III, 1878
  - Plaquemine Bayou, La., construction of lock ... I, 387; III, 1890
  - Pokegama Falls, Minn., construction of reservoir dam ... I, 444; III, 2309
  - Pokegama Falls, Minn., operating and care of reservoir dam ... I, 445; III, 2322
  - Pokegama Falls, Minn., survey of flowage lines of reservoir ... I, 451
  - Reelfoot levee district (Hickman, Ky., to Slough Landing, Tenn.), examination and survey ... I, 434; III, 2155, 2158
  - Reservoir dams at headwaters, construction of ... I, 444; III, 2309
  - Reservoir dams at headwaters, examination of Long Prairie River, Minn., and its sources ... I, 451; III, 2361

- Mississippi River—Continued.
  - Reservoir dams at headwaters, operating and care ........ I, 445; III, 2322
  - Reservoir dams at headwaters, survey of flowage lines ........ I, 451
  - St. Louis Harbor, Mo., discharge measurements ........ III, 2199
  - St. Louis Harbor, Mo., improvement of ........ I, 438; III, 2198
  - St. Paul, Minn., gauging at ........ I, 449; III, 2340
  - St. Paul, Minn., to Minneapolis, improvement from ........ I, 443; III, 2298
  - St. Paul, Minn., to Missouri River, improvement from ........ I, 440; III, 2238
  - Sandy Lake dam to Brainerd, Minn., survey from ........ I, 451; III, 2343
  - Slough Landing, Tenn., to Hickman, Ky., examination and survey ........ I, 434; III, 2155, 2158
  - Snag and dredge boats above Missouri River, operation of ........ I, 440; III, 2231
  - Snags and wrecks below Missouri River, removal of ........ I, 434; III, 2166
  - South Pass, maintenance of channel by representatives of James B. Eads ........ I, 118, 379; III, 1865
  - South Pass, maintenance of channel by United States ........ I, 385; III, 1881
  - Southwest Pass, project for improvement of ........ I, 383, 384; III, 1878
  - Vicksburg Harbor, Miss., improvement of ........ I, 421; III, 2052
  - Vidalia, La. (*see* Mississippi River Commission) ........ I, 657; S., 3, 32
  - Water-level observations at St. Louis, Mo ........ III, 2199
  - Water-level observations at St. Paul, Minn ........ I, 449; III, 2340
  - Water-level observations on, including tributaries . I, 425; III, 2072; S., 8, 45, 126
  - Waterway to Lake Michigan, examination for, with plan and estimate (act of 1900) ........ I, 534; IV, 3058
  - Waterway to Lake Michigan, survey for (act of 1899) ........ I, 534; IV, 3048
  - Wrecks, etc., above Missouri River, removal of ........ I, 440; III, 2231
  - Wrecks, etc., below Missouri River, removal of ........ I, 434; III, 2166
- Mississippi River Commission ........ I, 657; S., 3, 32
- Mississippi Sound, Miss.:
  - Defenses of ........ I, 6, 28, 836
  - Improvement of channel from Gulfport to Ship Island Harbor.. I, 374; III, 1846
  - Improvement of Horn Island Harbor ........ I, 371; III, 1842
  - Improvement of Ship Island Pass ........ I, 374; III, 1848
- Missouri Junction, Ill., bridge across Kaskaskia River ........ I, 667
- Missouri River:
  - Examination of Sioux River, S. Dak., for reservoir dam ........ I, 458; III, 2395
  - Improvement from Stubbs Ferry, Mont., to Sioux City, Iowa... I, 452; III, 2373
  - Improvement, surveys, etc., below Sioux City, Iowa ........ I, 658; S., 365, 382
  - Plan and estimate for rectification of, at St. Joseph, Mo ........ I, 452; III, 2367
  - Snagging upper river ........ I, 457; III, 2391
- Missouri River Commission ........ I, 658; S., 365, 382
- Mobile County, Ala., bridge across Dog River in ........ I, 665
- Mobile Harbor and River, Ala.:
  - Defenses of ........ I, 6, 28, 836
  - Examination and survey of bar below Fort Morgan ........ I, 378; III, 1854, 1856
  - Improvement of harbor ........ I, 364; III, 1810
  - Removal of wreck in river ........ I, 378; III, 1853
- Moccasin River (Contentnia Creek), N. C., improvement of ........ I, 301; II, 1488
- Mokelumne River, Cal., improvement of ........ I, 607; IV, 3419
- Monmouth County, N. J., bridge of ........ I, 663
- Monongahela River, W. Va. and Pa.:
  - Bridge at South Tenth street, Pittsburg, Pa ........ I, 662
  - Bridge between Port Vue and Jefferson, Pa ........ I, 661
  - Construction of locks and dams between Morgantown and Fairmont, W. Va ........ I, 477; IV, 2679
  - Improvement at Locks Nos. 3 and 6 ........ I, 478; IV, 2683
  - Improvement of Pittsburg Harbor ........ I, 480; IV, 2697
  - Operating and care of locks and dams ........ I, 479; IV, 2686
- Monroe, Fort, Va.:
  - Defenses of Hampton Roads ........ I, 6, 23, 802
  - Removal of wreck off ........ I, 298; II, 1462
- Monroe Harbor, Mich., improvement of ........ I, 571; IV, 3215
- Monuments.
  - To Sergt. Charles Floyd ........ I, 687; V, 3827
  - Washington Monument, District of Columbia ........ I, 675; V, 3689
- Moodus and East Hampton Railway Company, bridge of ........ I, 662
- *Moore, Harry* (scow), removal of wreck of ........ I, 272; II, 1391

- Morgan Canal, Tex.:
  - Improvement of (*see* Galveston ship channel) .... I, 404; III, 1933
  - Operating and care .... I, 405; III, 1937
- Morgan County, Ohio, bridge of .... I, 666
- Morgan, Fort, Mobile Harbor, Ala., examination and survey of bar below .... I, 378; III, 1854, 1856
- Mortar batteries .... I, 5, 7, 37
- Mosquito Creek Canal, S. C. (*see* Santee River) .... I, 316; II, 1587
- Mound City, Ill., prevention of Mississippi River from breaking into Cache River at .... I, 438; III, 2198
- Moundsville, Wis., bridge across Fox River at .... I, 664
- Mount Desert, Bar Harbor, Me., construction of breakwater .... I, 122; II, 991
- Mount Hope Bay, Mass., improvement of Fall River Harbor .... I, 169; II, 1134
- Mount Pleasant shore, Charleston, S. C., improvement at .... I, 320; II, 1598
- Mud Lake, Chicago, Ill., bridge across West Fork of South Branch, Chicago River, at .... I, 663
- Mud Lake, La. (*see* Mermentau River) .... I, 392; III, 1901
- Mud River, Ga., improvement of waterway via .... I, 332; II, 1653
- Mud River, S. C. (*see* Savannah-Beaufort channel) .... I, 324; II, 1628
- Murderkill River, Del., improvement of .... I, 254; II, 1342
- Muscle Shoals Canal, Tennessee River, Ala., operating and care .... I, 466; III, 2440
- Muskegon Harbor and River, Mich.:
  - Examination of, with plan and estimate .... I, 553; IV, 3131
  - Improvement of .... I, 545; IV, 3103
- Muskingum County, Ohio:
  - Bridge of, across Muskingum River, at Zanesville ("Y" Bridge) .... I, 659
  - Bridge of, across Muskingum River Canal, at Zanesville .... I, 667
- Muskingum River, Ohio:
  - Bridge above Lowell .... I, 660
  - Bridge at McConnelsville and Malta .... I, 666
  - Bridge at Zanesville, across canal .... I, 667
  - Bridge at Zanesville ("Y" Bridge) .... I, 659
  - Improvement of .... I, 485; IV, 2714
  - Operating and care of locks and dams .... I, 485; IV, 2714
- Mystic River, Conn., improvement of .... I, 178; II, 1162
- Mystic River, Mass.:
  - Improvement of .... I, 151; II, 1077
  - Improvement of, below mouth of Island End River .... I, 152; II, 1078

## N.

- **Nandua Creek, Va., improvement of** .... I, 295; II, 1454
- **Nansemond River, Va., improvement of** .... I, 293; II, 1450
- **Nanticoke River, Del. and Md., improvement of** .... I, 269; II, 1384
- **Nantucket, Mass., construction of harbor of refuge** .... I, 161; II, 1112
- **Napa River, Cal., improvement of** .... I, 609; IV, 3428
- **Narragansett Bay, R. I.:**
  - **Defenses of** .... I, 6, 16, 735
  - **Examination and survey of Ohio Reef (Ledge)** .... I, 175; II, 1154, 1156
  - **Improvement of** .... I, 167; II, 1129
- **Narraguagus River, Me., improvement of** .... I, 121; II, 989
- **Nashville, Tenn.:**
  - **Improvement of Cumberland River above** .... I, 462; III, 2411
  - **Improvement of Cumberland River below** .... I, 461; III, 2407
- **Natalbany River, La. (*see* Tickfaw)** .... I, 380; III, 1873
- **Natchez Harbor, Miss. (*see* Mississippi River Commission)** .... I, 657; S., 3, 32
- **Nauset Harbor, Mass., removal of wreck** .... I, 159; II, 1091
- **Navesink River, N. J. (*see* Shrewsbury)** .... I, 221; II, 1243
- **Navigable waters.** *See* Bridges, Rivers and harbors, *and* Wrecks.
- **Navy Department, bridge of, between Portsmouth Navy-Yard, N. H., and Kittery, Me** .... I, 664
- **Neches River, Tex., improvement of mouth** .... I, 396; III, 1907
- **Negro Cut, Indian River Inlet, Fla., improvement of** .... I, 339; II, 1742
- **Neuse River, N. C.:**
  - Improvement of .... I, 302; II, 1492
  - Improvement of waterway between Newbern and Beaufort .... I, 303; II, 1493
- **Neville Island, Ohio River, Pa., bridge across back channel at** .... I, 661

Newark Bay, N. J.:
  Harbor lines .......... I, 118, II, 1276
  Improvement of Staten Island-New Jersey channel .......... I, 215; II, 1233
  Removal of wreck near Corner Stake light .......... I, 223; II, 1247
Newark Plank Road Company, bridge of .......... I, 666
New Bedford Harbor, Mass.:
  Bridge across Acushnet River to Fish Island .......... I, 665
  Defenses of .......... I, 6, 16, 735
  Improvement of .......... I, 163; II, 1119
Newbern, N. C.:
  Examination and survey of Trent River at and above .......... I, 310; II, 1545, 1550
  Improvement of Neuse River .......... I, 302; II, 1492
  Improvement of Trent River .......... I, 302; II, 1490
  Improvement of waterway to Beaufort, N. C .......... I, 303; II, 1493
Newburyport Harbor, Mass., improvement of .......... I, 138; II, 1043
Newfields, N. H., bridge of town of .......... I, 668
New Haven Harbor, Conn.:
  Construction of breakwaters .......... I, 183; II, 1173
  Improvement of, by dredging .......... I, 182; II, 1170
New Jersey, bridge across Hudson River between Fifty-ninth and Sixtieth streets, New York City, and .......... I, 659
New Jersey-Staten Island channel:
  Harbor lines in Arthur Kill .......... I, 118; II, 1279
  Improvement of .......... I, 215; II, 1233
  Removal of wreck near Corner Stake light .......... I, 223; II, 1247
New London Harbor, Conn:
  Defenses of .......... I, 17, 747
  Improvement of (*see* Thames River) .......... I, 178; II, 1163
Newmarket, N. H., bridge across Exeter River .......... I, 668
New Meadows River, Me., bridge across .......... I, 669
New Orleans and Northwestern Railway Company, bridge of .......... I, 660
New Orleans Harbor, La.:
  Defenses of .......... I, 6, 30, 842
  Improvement of (*see* Mississippi River Commission) .......... I, 657; S., 3, 32
Newport Harbor, R. I.:
  Defenses of .......... I, 16, 735
  Improvement of .......... I, 170; II, 1136
Newport River, N. C.:
  Improvement of Beaufort Harbor .......... I, 304; II, 1495
  Improvement of waterway between Beaufort and New River .......... I, 304; II, 1496
  Improvement of waterway between Newbern and Beaufort .......... I, 303; II, 1493
New River, N. C.:
  Improvement of .......... I, 305; II, 1497
  Improvement of waterway to Beaufort, N. C .......... I, 304; II, 1496
New Shoreham, Block Island, R. I.:
  Construction of harbor of refuge .......... I, 172; II, 1141
  Improvement of Great Salt Pond .......... I, 174; II, 1144
Newtown Creek, N. Y.:
  Bridge between Vernon and Manhattan avenues, New York City .......... I, 667
  Improvement of .......... I, 207; II, 1216
New Whatcom, Wash., bridge across Whatcom Creek Waterway at .......... I, 663
New York and New Jersey Bridge Company, bridge of .......... I, 659
New York Connecting Railroad Company:
  Bridge of, across East River at Hell Gate, near Astoria .......... I, 664
  Bridge of, across Little Hell Gate and Bronx Kills .......... I, 665
New York Harbor, N. Y.:
  Ambrose Channel, improvement of .......... I, 224; II, 1285
  Arthur Kill, harbor lines .......... I, 118; II, 1279
  Arthur Kill, improvement of (*see* Staten Island-New Jersey channel) .......... I, 215; II, 1233
  Astoria, bridge across East River at Hell Gate, near .......... I, 664
  Bay Ridge Channel, improvement of .......... I, 226; II, 1291
  Bayside Channel, improvement of .......... I, 224; II, 1285
  Blackwells Island, bridge across East River at .......... I, 665
  Bronx Kills, bridge across .......... I, 665
  Bronx River, bridge at Westchester avenue .......... I, 664
  Bronx River, harbor lines .......... I, 118; II, 1266

New York Harbor, N. Y.—Continued.
- Bronx River, improvement of ... I, 201; II, 1203
- Buttermilk Channel, examination and survey ... I, 229; II, 1299, 1303
- Buttermilk Channel, improvement of ... I, 226; II, 1291
- Buttermilk Channel, removal of wreck ... I, 229; II, 1299
- College Point, East River, harbor lines ... I, 119; II, 1305
- Communipaw Channel, removal of wreck in ... I, 223; II, 1247
- Corner Stake light, Newark Bay, removal of wreck near ... I, 223; II, 1247
- Defenses of ... I, 6, 19, 757, 917
- East (Ambrose) Channel, improvement of ... I, 224; II, 1285
- East River, bridge at Blackwells Island, from 60th street to Long Island City ... I, 665
- East River, bridge at Hell Gate, near Astoria ... I, 664
- East River, bridge at Little Hell Gate and Bronx Kills ... I, 665
- East River, harbor lines at College Point ... I, 119; II, 1305
- East River, improvement of ... I, 205; II, 1211
- East River, improvement of Wallabout Channel ... I, 208; II, 1218
- East River, removal of wreck off Greenpoint ... I, 223; II, 1248
- Ellis Island, removal of wrecks near ... I, 223; II, 1248
- Flushing Bay, improvement of ... I, 204; II, 1210
- Fort Totten, post of ... I, 38, 927
- Gedney Channel, improvement of ... I, 224; II, 1285
- Governors Island, enlargement of ... I, 228; II, 1298
- Gowanus Bay and Canal, improvement of ... I, 226; II, 1291
- Gowanus Creek Channel, improvement of ... I, 227; II, 1296
- Greenpoint, N. Y., removal of wreck off ... I, 223; II, 1248
- Guttenberg, N. J., harbor lines ... I, 118; II, 1273
- Harlem River, bridge between 145th and 149th streets ... I, 663
- Harlem River, improvement of ... I, 206; II, 1214
- Hell Gate, East River, bridge at, near Astoria ... I, 664
- Hell Gate, East River, improvement of ... I, 205; II, 1211
- Hudson River, bridge across, between 59th and 60th streets ... I, 659
- Hudson River, harbor lines at Guttenberg, N. J ... I, 118; II, 1273
- Improvement of ... I, 224; II, 1285
- Kill van Kull (*see* Staten Island-New Jersey channel) ... I, 215; II, 1233
- Lemon Creek (*see* Staten Island-New Jersey channel) ... I, 215; II, 1233
- Little Hell Gate, bridge across ... I, 665
- Long Island City, bridge across East River to 60th street ... I, 665
- Main Ship Channel, improvement of ... I, 224; II, 1285
- Narrows to the sea, improvement from ... I, 224; II, 1285
- Newark Bay, improvement of Staten Island-New Jersey channel I, 215; II, 1233
- Newark Bay, removal of wreck near Corner Stake light ... I, 223; II, 1247
- New Jersey-Staten Island channel, harbor lines in Arthur Kill ... I, 118; II, 1279
- New Jersey-Staten Island channel, improvement of ... I, 215; II, 1233
- New Jersey-Staten Island channel, removal of wreck ... I, 223; II, 1247
- Newtown Creek, bridge across ... I, 667
- Newtown Creek, improvement of ... I, 207; II, 1216
- Red Hook Channel, improvement of ... I, 226; II, 1291
- Sandy Hook, N. J., removal of wreck at ... I, 229; II, 1299
- Spuyten Duyvil Creek (*see* Harlem River) ... I, 206; II, 1214
- Staten Island-New Jersey channel, harbor lines in Arthur Kill ... I, 118; II, 1279
- Staten Island-New Jersey channel, improvement of ... I, 215; II, 1233
- Staten Island-New Jersey channel, removal of wreck ... I, 223; II, 1247
- Staten Island Sound (Arthur Kill), harbor lines ... I, 118; II, 1279
- Staten Island Sound (Arthur Kill), improvement of (*see* Staten Island-New Jersey channel) ... I, 215; II, 1233
- Supervision of ... I, 656; V, 3607
- Totten, Fort, post of ... I, 38, 927
- Wallabout Channel, improvement of ... I, 208; II, 1218
- Willets Point ... I, 38, 41, 42, 927

Niagara River, N. Y.:
- Buffalo Harbor, improvement of ... I, 587; IV, 3305
- Erie Basin and Black Rock Harbor, examination and survey of Lake Erie entrance ... I, 592; IV, 3342, 3345
- Erie Basin and Black Rock Harbor, harbor lines ... I, 119; IV, 3349
- Erie Basin and Black Rock Harbor, improvement of Buffalo entrance ... I, 589; IV, 3324

Niagara River, N. Y.—Continued.
  North Tonawanda to Lake Erie, including Tonawanda Harbor, improvement from ..... I, 590; IV, 3335
  Surveys (*see* Northern and Northwestern Lakes) ..... I, 677; V, 3761
  Tonawanda to Port Day, improvement from ..... I, 591; IV, 3340
Nicollet Island, Mississippi River, Minn., bridges at ..... I, 667
Niles Ferry, Little Tennessee River, Tenn., bridge near ..... I, 668
*Nisbet, W. F.* (steamboat), removal of wreck of ..... I, 473; IV, 2646
Nomini Creek, Va., improvement of ..... I, 279; II, 1409
Nooksak River, Wash. (*see* Puget Sound) ..... I, 645; V, 3581
Norfolk Harbor, Va.:
  Defenses of Hampton Roads ..... I, 6, 23, 802
  Examination and plan and estimate for improvement at Pinner Point ..... I, 299; II, 1463, 1466
  Improvement of, and its approaches ..... I, 292; II, 1447
  Improvement of waterway to Albemarle Sound, via Currituck Sound ..... I, 297; II, 1457
  Improvement of waterway to sounds of North Carolina, via Pasquotank River ..... I, 296; II, 1455
  Improvement of Western Branch, Elizabeth River ..... I, 293; II, 1449
*Norris, L. W.* (schooner), removal of wreck of ..... I, 263; II, 1352
North Branch, Chicago River, Ill.:
  Bridge across, at Clybourn place, Chicago ..... I, 663
  Bridge across canal at Division street, Chicago, construction of ..... I, 666
  Bridge across canal at Division street, Chicago, reconstruction of ..... I, 662
  Bridge across canal at Goose Island, Cherry street, Chicago ..... I, 665
  Improvement of ..... I, 529; IV, 2992
North Carolina, defenses of coast of ..... I, 6, 24, 812, 921
North Carolina Cut, N. C., improvement of waterway via ..... I, 297; II, 1457
Northeast Branch, Cape Fear River, N. C., improvement of ..... I, 306; II, 1500
Northern and Northwestern Lakes:
  Commercial statistics, Sault Ste. Marie canals, Mich ..... I, 565; IV, 3173
  Defenses of ..... I, 32, 854
  Engineering methods used at harbors on Lake Erie west of Erie, Pa ..... IV, 3213
  Improvement of channels in waters connecting ..... I, 563; IV, 3157
  Notes on rock found in vicinity of Duluth, Minn ..... IV, 2883
  Surveys and charts ..... I, 677, 681; V, 3761
  Water levels ..... I, 681; V, 3776
  Waterways to Atlantic Ocean, disbursements for examinations and surveys ..... I, 118
North Fork, Skagit River, Wash. (*see* Puget Sound) ..... I, 645; V, 3581
North Hero Island, Lake Champlain, Vt., improvement of channel between South Hero Island and ..... I, 148
North Landing River, Va. and N. C., improvement of waterway via ..... I, 297; II, 1457
North Point Creek, Patapsco River, Md., removal of wreck ..... I, 272; II, 1390
North (Tolomato) River, Fla. (*see* St. Augustine Harbor) ..... I, 338; II, 1741
North River, N. Y. *See* Hudson River *and* New York Harbor.
North River, N. C., improvement of waterway via ..... I, 297; II, 1457
North River, Wash. (*see* Willapa River) ..... I, 641; V, 3577
North Tonawanda, N. Y. (*see* Tonawanda) ..... I, 590; IV, 3335
Norwalk Harbor, Conn., improvement of ..... I, 191; II, 1181
Norwich Harbor, Conn. (*see* Thames River) ..... I, 178; II, 1163
Noxubee River, Miss., improvement of ..... I, 370; III, 1840

O.

Oak Creek, Wis. (*see* South Milwaukee Harbor) ..... I, 523; IV, 2942
Oakland Harbor, Cal.:
  Defenses of San Francisco ..... I, 6, 33, 860
  Examination and survey ..... I, 613; IV, 3434, 3445
  Improvement of ..... I, 605; IV, 3413
Obion River, Tenn.:
  Bridge near Lanes Ferry ..... I, 667
  Improvement of ..... I, 458; III, 2403
Occoquan Creek, Va., improvement of ..... I, 278; II, 1407
Ocmulgee River, Ga., improvement of ..... I, 330; II, 1646
Oconee River, Ga., improvement of ..... I, 329; II, 1644

Oconto Harbor, Wis., improvement of ... I, 516; IV, 2910
Ocracoke Inlet, N. C.:
    Examination and survey of waterway from South Mills to and including ... I, 299, 309; II, 1511
    Improvement of ... I, 299; II, 1484
Odessa Landing, Appoquinimink River, Del., removal of wreck ... I, 263; II, 1352
Office of the Chief of Engineers, officers on duty in ... I, 688
Ogdensburg Harbor, N. Y., improvement of ... I, 598; IV, 3374
Ohio Reef (Ledge), Narragansett Bay, R. I., examination and survey ... I, 175; II, 1154, 1156
Ohio River:
    Allegheny City, Pa., harbor lines ... I, 119; IV, 2709
    Bridge at Bellaire, Ohio, and Benwood, W. Va ... I, 660
    Bridge at Ironton, Ohio, and Ashland, Ky ... I, 660
    Bridge at Neville Island, Pa., across back channel ... I, 661
    Bridge at Parkersburg, W. Va ... I, 664
    Bridge of Ohio River Bridge and Ferry Company between Williamstown, W. Va., and Marietta, Ohio ... I, 660
    Bridge of Williamstown and Marietta Bridge and Transportation Company between Williamstown, W. Va., and Marietta, Ohio ... I, 661
    Davis Island dam, Pa., operating and care ... I, 473; IV, 2657
    Falls at Louisville, Ky., improvement of ... I, 496; IV, 2783
    Gauging (*see* Mississippi River) ... I, 425; III, 2072; S., 8, 45, 126
    Improvement by open-channel work ... I, 470; IV, 2597
    Indiana Chute, Louisville, Ky., improvement of ... I, 496; IV, 2783
    Louisville and Portland Canal, enlargement of ... I, 496; IV, 2783
    Louisville and Portland Canal, operating and care ... I, 499; IV, 2791
    Louisville and Portland Canal, removal of wreck ... I, 505; IV, 2816
    Marietta, Ohio, to the Big Miami, survey from ... I, 472; IV, 2608
    Maysville, Ky., examination and survey for harbor of refuge (ice harbor) at ... I, 477; IV, 2670, 2675
    Movable dams, construction of ... I, 474; IV, 2661
    Pittsburg Harbor, harbor lines at Allegheny City ... I, 119; IV, 2709
    Pittsburg Harbor, improvement of ... I, 480; IV, 2697
    Sand Island, Ky., examination relative to purchase of ... I, 505; IV, 2817
    Snag boat, operation of ... I, 473; IV, 2646
    Wreck in Louisville and Portland Canal, removal of ... I, 505; IV, 2816
    Wrecks, removal of certain ... I, 473; IV, 2646
Ohio River Bridge and Ferry Company, bridge of ... I, 660
Oil City, Pa., bridge across Allegheny River between Franklin and ... I, 663
Oil City, Rouseville and Franklin Railroad Company, bridge of ... I, 663
Oil City Station Railway Company, bridge of ... I, 663
Okanogan River, Wash., improvement of ... I, 652; V, 3590
Okaw (Kaskaskia) River, Ill., bridge across ... I, 667
Okechobee Lake, Fla., examination and survey of waterway via ... I, 350
Oklawaha River, Fla., improvement of ... I, 338; II, 1740
Old Orchard Shoal light, Raritan Bay, N. J., removal of wreck near ... I, 223; II, 1247
Old Plantation light-house, Chesapeake Bay, Va., removal of wreck near ... I, 298; II, 1462
Old Tampa Bay, Fla. (*see* Tampa Bay) ... I, 345; III, 1756
Olympia Harbor, Wash., improvement of ... I, 645; V, 3582
Ontario Lake:
    *See also* Northern and Northwestern Lakes.
    Water levels ... I, 681; V, 3776
Ontonagon Harbor, Mich., improvement of ... I, 510; IV, 2865
Orange Mills Flats, St. Johns River, Fla., improvement at ... I, 336; II, 1737
Ordnance. *See* Fortifications.
Osage River, Mo.:
    Estimate of cost of completing Lock and Dam No. 1, at Brenneckes Shoals ... I, 452; III, 2369
    Improvement by Missouri River Commission ... I, 658; S., 365, 382
Oswegatchie River, N. Y. (*see* Ogdensburg Harbor) ... I, 598; IV, 3374
Oswego Harbor, N. Y.:
    Improvement of ... I, 595; IV, 3365
    Water levels ... I, 681; V, 3776
Otter Creek, Vt., improvement of ... I, 148; II, 1054
Otter Tail Lake and River, Minn., survey for reservoir dam ... I, 450; III, 2341

- Ouachita River, Ark. and La.:
  - Examination of Camden Harbor, Ark ...... I, 425; III, 2090
  - Improvement of ...... I, 415; III, 2034

## P.

- Pagan River, Va., examination and survey ...... I, 299; II, 1474, 1477
- Palmbeach, Fla., bridge across Lake Worth ...... I, 667
- Pamlico River, N. C.:
  - Harbor lines at Washington ...... I, 119; II, 1570
  - Improvement of ...... I, 301; II, 1487
- Pamlico Sound, N. C.:
  - Examination and survey of waterway via ...... I, 299, 309; II, 1511
  - Improvement of waterway to Norfolk, Va ...... I, 296; II, 1455
- Pamunkey River, Va., improvement of ...... I, 288; II, 1421
- Parkersburg, W. Va., bridge across Ohio River at ...... I, 664
- Parks, public, District of Columbia ...... I, 675; V, 3689
- Pascagoula River, Miss.:
  - Improvement above mouth of Dog River ...... I, 371; III, 1840
  - Improvement below mouth of Dog River ...... I, 371; III, 1842
- Pasquotank River, N. C.:
  - Examination and survey of waterway via ...... I, 299, 309; II, 1511
  - Improvement of waterway via ...... I, 296; II, 1455
- Passaic River, N. J.:
  - Bridge across ...... I, 666
  - Improvement of ...... I, 214; II, 1231
- Pass a Loutre, Mississippi River, La.:
  - Closing crevasse in ...... I, 382; III, 1877
  - Constructing sill across ...... I, 383; III, 1878
- Patapsco River, Md.:
  - Defenses of Baltimore ...... I, 6, 22, 784
  - Estimate of cost of deepening and widening channel of Curtis Bay, and of main ship channel of Baltimore Harbor and ...... I, 273; II, 1394
  - Improvement of, and channel to Baltimore ...... I, 264; II, 1374
  - Improvement of channel to Curtis Bay ...... I, 265; II, 1379
  - Improvement of harbor at southwest Baltimore (Spring Garden) I, 266; II, 1379
  - Removal of wreck in Fort McHenry Channel ...... I, 272; II, 1391
  - Removal of wreck in North Point Creek ...... I, 272; II, 1390
- Patchogue River, N. Y.:
  - Examination and survey ...... I, 223; II, 1249, 1255
  - Improvement of ...... I, 210; II, 1220
- Pawcatuck River, R. I. and Conn., improvement of ...... I, 175; II, 1159
- Pawpaw River, Mich.:
  - Bridges (5) obstructing, near Benton Harbor ...... I, 668
  - Improvement of (*see* St. Joseph Harbor) ...... I, 537; IV, 3079
- Pawtucket Harbor and River, R. I.:
  - Examination of ...... I, 175; II, 1152
  - Improvement of ...... I, 166; II, 1127
- Peace Creek, Fla., improvement of ...... I, 343; III, 1752
- Pearl Harbor, Hawaiian Islands:
  - Defenses of ...... I, 6
  - Improvement of ...... I, 612; IV, 3433
- Pearl River, Miss.:
  - Carthage to Jackson, improvement from ...... I, 376; III, 1850
  - Edinburg to Carthage, improvement from ...... I, 377; III, 1851
  - Mouth, improvement of ...... I, 375; III, 1848
  - Rockport, improvement below ...... I, 375; III, 1849
- Pedee rivers, S. C.:
  - Examination and survey of Great Pedee between Cheraw and the Wilmington, Columbia and Augusta Railroad bridge ...... I, 324; II, 1607, 1614
  - Improvement of Great Pedee ...... I, 312; II, 1578
  - Improvement of Little Pedee ...... I, 311; II, 1576
- Peekskill Harbor, N. Y., improvement of ...... I, 213; II, 1230
- Pender County, N. C., bridge of ...... I, 661
- Pend Oreille River, Wash., improvement of ...... I, 653; V, 3591
- Pennsylvania Railroad Company, bridge of ...... I, 661

Penobscot River, Me.:
  Defenses of I, 6, 14, 697, 911
  Harbor lines at Bangor I, 118; II, 1022
  Improvement of I, 126; II, 997
Pensacola Harbor, Fla.:
  Defenses of I, 6, 27, 832
  Harbor lines I, 119; III, 1806
  Improvement of I, 358; III, 1781
Pentwater Habor, Mich., improvement of I, 547; IV, 3110
Pequonnock River, Conn. (*see* Bridgeport Harbor) I, 186; II, 1177
Pere Marquette Lake, Mich. (*see* Ludington Harbor) I, 548; IV, 3112
Pere Marquette Railroad Company, bridges of I, 668
Petaluma Creek, Cal., improvement of I, 610; IV, 3429
Petersburg, Va.:
  Examination and survey for deflection of Appomattox River at I, 299; II, 1467, 1471
  Improvement of Appomattox River at I, 294; II, 1452
Petoskey Harbor, Mich., improvement of I, 553; IV, 3129
Philadelphia, Pa.:
  Bridge across Schuylkill River at Grays Ferry I, 665
  Defenses of Delaware River I, 6, 21, 37, 770
  Improvement of Delaware River at I, 230; II, 1310
  Improvement of Schuylkill River at I, 233; II, 1319
  Removal of wrecks in Schuylkill River I, 262, 263; II, 1350, 1352
Philadelphia and Chester Railway Company, bridges of I, 663
Philadelphia, Wilmington and Baltimore Railroad Company:
  Bridge of, across Broad Creek River, Del I, 666
  Bridge of, across Schuylkill River, Pa I, 665
Philippines:
  Operations of Engineer Department in the I, 43, 975
  Report upon work of department of city public works and water supply, Manila I, 683, 684
*Phillips, W. K.* (steamer), removal of wreck of I, 463; III, 2417
Pierre, S. Dak., improvement of Missouri River at I, 452, 454; III, 2373, 2374
Pierre, Fort, S. Dak., improvement of Missouri River at I, 452, 454; III, 2373, 2374
Pigeon Bayous, La., improvement of I, 387; III, 1890
Pike, Albert, statue of I, 676; V, 3689
Pike Creek, Wis.:
  Bridge at Kenosha I, 667
  Improvement of Kenosha Harbor I, 524; IV, 2945
Pinebluff, Ark. *See* Arkansas River.
Pine Lake and River (Charlevoix County), Mich.:
  Bridge across river at Charlevoix I, 665
  Bridge across South Arm of lake I, 666
  Improvement of (*see* Charlevoix Harbor) I, 552; IV, 3126
Pine River (St. Clair County), Mich., improvement of I, 560; IV, 3150
Pine River, Minn.:
  Construction of reservoir dam I, 444; III, 2309
  Operating and care of reservoir dam I, 445; III, 2322
  Survey of flowage lines of reservoir I, 451
Pineville, La., bridge across Red River between Alexandria and I, 659
Pinner Point, Norfolk Harbor, Va.:
  Examination and plan and estimate for improvement at I, 299; II, 1463, 1466
  Improvement at I, 292; II, 1447
Piscataqua River, Me. and N. H.:
  Bridge between Portsmouth Navy-Yard, N. H., and Kittery, Me I, 664
  Defenses of Portsmouth, N. H I, 6, 15, 713
  Examination and survey of Hendersons Point, Portsmouth Harbor I, 149; II, 1057, 1062
Pittsburgh and Lake Erie Railroad Company, bridge of I, 661
Pittsburg Harbor, Pa.:
  Bridge across Allegheny River to Allegheny (Fort Wayne Bridge) I, 662
  Bridge across Monongahela River at South Tenth street I, 662
  Construction of Herr Island lock and dam, Allegheny River I, 482; IV, 2701
  Harbor lines at Allegheny City I, 119; IV, 2709
  Improvement of I, 480; IV, 2697
  Operating and care of Davis Island dam, Ohio River I, 473; IV, 2657

**Pittsburgh, Cincinnati, Chicago and St. Louis Railway Company, bridge of.** I, 663
**Pittsburgh, Fort Wayne and Chicago Railway, bridge of** I, 662
**Plaquemine Bayou, La.:**
  Bridge across I, 668
  Improvement of I, 387; III, 1890
  Removal of water hyacinths I, 395; III, 1906
**Pleasant Valley Landing, Hudson River, N. J., harbor lines from Bloomers to** I, 118; II, 1270
**Plymouth Harbor, Mass., improvement of** I, 157; II, 1087
**Pneumatic dynamite batteries** I, 10
**Pocomoke River, Md., improvement of** I, 271; II, 1388
**Poinsett Lake, S. Dak.** (*see* Sioux River) I, 458; III, 2395
**Point Judith Harbor and Pond, R. I.:**
  Construction of harbor of refuge I, 171; II, 1138
  Improvement of pond entrance I, 172; II, 1140
**Pokegama Falls, Mississippi River, Minn.:**
  Construction of reservoir dam I, 444; III, 2309
  Operating and care of reservoir dam I, 445; III, 2322
  Survey of flowage lines of reservoir I, 451
**Pollock Rip light-ship, Mass., removal of wrecks near** I, 174; II, 1147
**Polloksville, N. C., examination and survey of Trent River above and below** I, 310; II, 1545, 1550
**Ponchatoula River, La.** (*see* Tickfaw) I, 380; III, 1873
**Ponsett (Poinsett) Lake, S. Dak.** (*see* Sioux River) I, 458; III, 2395
**Porcupine Island, Bar Harbor, Me., construction of breakwater** I, 122; II, 991
**Portage Lake and River, Houghton County, Mich.:**
  Bridge between Houghton and Hancock I, 664
  Waterway via I, 511, 512; IV, 2867
**Portage Lake, Manistee County, Mich., improvement of harbor of refuge** I, 550; IV, 3119
**Portage River, Ohio** (*see* Port Clinton Harbor) I, 573; IV, 3227
**Port Chester Harbor, N. Y.:**
  Harbor lines I, 118; II, 1261
  Improvement of I, 198; II, 1198
  Removal of wreck off I, 223; II, 1246
**Port Clinton Harbor, Ohio, improvement of** I, 573; IV, 3227
**Port Day, N. Y.** (*see* Niagara River) I, 591; IV, 3340
**Port Harford, Cal.** (*see* San Luis Obispo) I, 602; IV, 3401
**Port Huron, Mich., improvement of Black River at** I, 559; IV, 3148
**Port Jefferson Harbor, N. Y., improvement of** I, 202; II, 1206
**Portland, Ky.:**
  Enlargement of Louisville and Portland Canal I, 496; IV, 2783
  Operating and care of Louisville and Portland Canal I, 499; IV, 2791
  Removal of wreck in Louisville and Portland Canal I, 505; IV, 2816
**Portland, Me.:**
  Bridge of Boston and Maine Railroad Company obstructing Fore River. I, 668
  Bridge (Tukeys) obstructing Back Cove I, 668
  Bridge (Vaughan) obstructing Fore River I, 668
  Defenses of I, 6, 7, 14, 697, 698, 911
  Examination and survey for removal of Witch Rock I, 133; II, 1009, 1015
  Harbor lines I, 118; II, 1027
  Improvement of harbor I, 131; II, 1006
**Portland, Oreg.:**
  Improvement of Willamette River above I, 631; V, 3550
  Improvement of Willamette River below I, 633; V, 3557
**Porto Rico:**
  Defenses of I, 6, 36, 909
  Reconnaissances and explorations in I, 683, 684; V, 3799
  Removal of wreck in San Juan Harbor I, 657; V, 3635
**Port Royal (Beaufort) River, S. C.:**
  Defenses of Port Royal Sound I, 6, 25, 816
  Improvement of I, 323; II, 1604
  Improvement of waterway between Beaufort, S. C., and Savannah (*see* Savannah) I, 324; II, 1628
  Removal of sunken logs in waterway between Beaufort, S. C., and Charleston I, 324; II, 1628
**Port Royal Sound, S. C., defenses of** I, 6, 25, 816

- Portsmouth Harbor, N. H.:
  - Bridge between Kittery, Me., and the navy-yard .... I, 664
  - Defenses of .... I, 6, 15, 713
  - Examination and survey of Hendersons Point .... I, 149; II, 1057, 1062
- Port Tampa, Fla. (*see* Tampa Bay) .... I, 345; III, 1756
- Port Vue, Pa., bridge across Monongahela River between Jefferson and .... I, 661
- Port Washington Harbor, Wis., improvement of .... I, 521; IV, 2934
- Position finders, range and .... I, 10, 37
- Post of Fort Totten, N. Y .... I, 38, 927
- *Potomac* (dredge), removal of wreck of, in Delaware Breakwater Harbor, Del .... I, 263; II, 1351
- *Potomac* (steamboat), removal of wreck of, in Ohio River .... I, 473; IV, 2646
- Potomac Park, Washington, D. C .... I, 676; V, 3689
- Potomac River:
  - *See also* Washington, D. C.
  - Aqueduct Bridge, Washington, D. C., repair of .... I, 669; V, 3637
  - Defenses of Washington, D. C .... I, 6, 23, 791
  - Highway bridge at Washington, D. C., plans, etc., for .... I, 119
  - Improvement at Washington, D. C .... I, 273; II, 1399
  - Improvement below Washington, D. C .... I, 276; II, 1405
  - Long Bridge, at Washington, D. C., rebuilding of .... I, 275; II, 1399
  - Memorial Bridge, Washington, D. C .... I, 670; V, 3618
- Powow River, Mass., improvement of .... I, 140; II, 1046
- Preble, Fort, Portland Harbor, Me.:
  - Defenses at .... I, 6, 697, 911
  - Tests of results of firing mortars at .... I, 7
- Preliminary examinations of rivers and harbors, estimate of appropriation for .... I, 656
- President Roads, Boston, Mass. *See* Boston.
- Princeton, Wis., bridge across Fox River at .... I, 663
- Princeton and Northwestern Railway Company, bridge of .... I, 663
- Printing Office, Government, Washington, D. C.:
  - Construction of building for use of .... I, 685; V, 3801
  - Telegraph line .... I, 676; V, 3689
- Providence Harbor and River, R. I.:
  - Improvement of .... I, 167; II, 1129
  - Removal of Green Jacket Shoal .... I, 168; II, 1132
- Provincetown Harbor, Mass., improvement of .... I, 157; II, 1089
- Public buildings and grounds, District of Columbia .... I, 675; V, 3689
- Puget Sound, Wash.:
  - Defenses of .... I, 6, 35, 901
  - Improvement of, and tributaries .... I, 645; V, 3581
  - Improvement of waterway to lakes Union and Washington .... I, 646; V, 3583
- Pultneyville Harbor, N. Y., improvement of .... I, 594; IV, 3359
- Punta Gorda, Fla. (*see* Charlotte Harbor) .... I, 343; III, 1752
- Purification of water supply of Washington, D. C .... I, 674; V, 3680
- Puyallup River, Wash.:
  - Bridge at Tacoma .... I, 666
  - Examination and survey of Tacoma Harbor .... I, 655; V, 3593, 3595
  - Improvement of (*see* Puget Sound) .... I, 645; V, 3581

## Q.

- Quantico Creek, Va., examination of .... I, 292; II, 1440
- Queen Anne's Railroad Company, bridge of .... I, 665
- Queenstown Harbor, Md., improvement of .... I, 266; II, 1380
- Quinnipiac River, Conn. (*see* New Haven Harbor) .... I, 182; II, 1170

## R.

- Racine Harbor, Wis., improvement of .... I, 523; IV, 2942
- Railway, boat, Columbia River, Oreg. and Wash .... I, 625; V, 3491
- Raisin River, Mich. (*see* Monroe Harbor) .... I, 571; IV, 3215
- *Ronald* (steamship), removal of wreck of .... I, 263; II, 1353
- Rancocas River, N. J.:
  - Improvement of .... I, 238; II, 1327
  - Removal of wreck above Bridgeboro .... I, 262; II, 1351

- Range and position finders … I, 10, 37
- *Ransom, B. P.* (canal boat), removal of wreck of … I, 223; II, 1248
- Rappahannock River, Va., improvement of … I, 282; II, 1411
- Raritan Bay and River, N. J.:
  - Improvement of bay … I, 218; II, 1238
  - Improvement of Keyport Harbor … I, 220; II, 1241
  - Improvement of river … I, 217; II, 1236
  - Improvement of Shoal Harbor … I, 220; II, 1242
  - Removal of wreck near Old Orchard Shoal light … I, 223; II, 1247
- Reconnaissances and explorations, military … I, 683; V, 3799
- Red Hook Channel, New York Harbor, N. Y., improvement of … I, 226; II, 1291
- Red Lake, Minn.:
  - Improvement of (*see* Red River of the North) … I, 447; III, 2335
  - Survey for reservoir dam … I, 450; III, 2340
- Red Lake River, Minn.:
  - Improvement of (*see* Red River of the North) … I, 447; III, 2335
  - Survey for reservoir dam at outlet of Red Lake … I, 450; III, 2340
- Red River, La., Ark., Tex., and Ind. T.:
  - Bridge between Alexandria and Pineville, La … I, 659
  - Examination from Shreveport, La., to Denison, Tex … I, 425; III, 2073
  - Gauging (*see* Mississippi River) … I, 425; III, 2072; S., 8, 45, 126
  - Improvement of … I, 412; III, 2025
  - Rectification of mouth by Mississippi River Commission … I, 657; S., 3, 32
- Red River of the North, Minn. and N. Dak.:
  - Improvement of … I, 447; III, 2335
  - Survey of Otter Tail Lake and River for reservoir dam to improve navigation on … I, 450; III, 2341
  - Survey of Red Lake and Red Lake River for reservoir dam to improve navigation on … I, 450; III, 2340
- Reelfoot levee district, Mississippi River (Hickman, Ky., to Slough Landing, Tenn.), examination and survey … I, 434; III, 2155, 2158
- Rensselaer and Saratoga Railroad, bridge of … I, 669
- Reservations, public, District of Columbia … I, 675; V, 3689
- Reservoirs:
  - Big Sioux River, S. Dak., examination for … I, 458; III, 2395
  - Big Stone Lake, Minn. and S. Dak., survey for … I, 450; III, 2342
  - Kampeska Lake, S. Dak., examination for (*see* Sioux River) … I, 458; III, 2395
  - Long Prairie River, Minn., and its sources, examination for … I, 451; III, 2361
  - Mississippi River, headwaters of, construction of … I, 444; III, 2309
  - Mississippi River, headwaters of, operating and care … I, 445; III, 2322
  - Mississippi River, headwaters of, survey of flowage lines … I, 451
  - Otter Tail Lake and River, Minn., survey for … I, 450; III, 2341
  - Poinsett Lake, S. Dak., examination for (*see* Sioux River) … I, 458; III, 2395
  - Red Lake and Red Lake River, Minn., survey for … I, 450; III, 2340
  - Sioux River, S. Dak., examination for … I, 458; III, 2395
  - Traverse Lake, Minn. and S. Dak., survey for … I, 450; III, 2342
  - Washington Aqueduct, D. C … I, 671, 673, 674; V, 3651, 3666, 3680
- Revetments, application of the road scraper and floating derrick to grading river banks to receive … III, 2225
- Rhode Island, defenses of southeast coast of … I, 6, 16, 735
- Riverdale, Ill., bridge across Little Calumet River at … I, 664
- Rivers and harbors:
  - *See also* Engineering methods.
  - Appropriation for examinations, surveys, etc., for 1902–3, estimate of … I, 656
  - Appropriations for improvements for 1902–3, estimates of … I, 118
  - Appropriations for operations during the past year … I, 117
  - Bridges … I, 659, 661, 667
  - Expenditures during the past year … I, 118
  - Harbor lines, establishment of … I, 118
  - Status of works … I, 118
- Riverton, N. J., removal of wrecks in Delaware River below … I, 262; II, 1351
- Riverview, Fla., bridge across Alafia River at … I, 664
- *Roach, Wm. H.* (schooner), removal of wreck of … I, 272; II, 1390
- Roads:
  - Fort Washakie, Wyo., to Buffalo Fork, Snake River … I, 686; V, 3823
  - Scrapers, application of, to grading river banks to receive revetments … III, 2225
  - Yellowstone National Park … I, 682; V, 3777

- Roanoke River, N. C., improvement of I, 298; II, 1461
- *Robinson, Laura* (schooner), removal of wreck of I, 174; II, 1147
- Robinsons Hole, Vineyard Sound, Mass., removal of wreck near I, 174; II, 1147
- Rock found in vicinity of Duluth, Minn., notes on IV, 2883
- Rockhaven, N. Dak., ice harbor in Missouri River at I, 452, 456; III, 2373, 2377
- Rockland Harbor, Me., improvement of I, 128; II, 1000
- Rockport, Mass., construction of harbor of refuge in Sandy Bay I, 141; II, 1048
- Rock River, Ill.:
  - Construction of canal around I, 532; IV, 3014
  - Examination for lock and dam at feeder I, 534; IV, 3066
  - Operating and care of canal around I, 442; III, 2291
- Rod float, full depth, method of discharge measurement, illustration of the III, 2199
- Romerly Marsh, Ga., improvement of waterway via I, 332; II, 1653
- Rondout Harbor, N. Y., improvement of I, 213; II, 1228
- Root River, Wis. (*see* Racine Harbor) I, 523; IV, 2942
- Rouge River, Mich.:
  - Bridge at Dix avenue I, 664
  - Improvement of I, 562; IV, 3155
- Rough River, Ky.:
  - Improvement of I, 504; IV, 2814
  - Operating and care of lock and dam I, 504; IV, 2815
- Round Lake, Mich. (*see* Charlevoix Harbor) I, 552; IV, 3126
- *Rover* (steamer), wreck of (*see* Yazoo River) I, 420; III, 2048
- Rumsey, Ky., Lock No. 2, Green River I, 502, 503; IV, 2805, 2806

S.

- Sabine Lake, Pass, and River, Tex.:
  - Defenses of I, 6, 30, 842
  - Effects of storm of September, 1900, at Sabine Pass I, 402; III, 1919
  - Examination and plan and estimate for improvement of pass. I, 401; III, 1915, 1918
  - Improvement of mouth of river and of channel through lake I, 396; III, 1907
  - Improvement of river I, 397; III, 1908
  - Improvement of Sabine Pass Harbor I, 398; III, 1910
- Saco River, Me., improvement of I, 133; II, 1036
- Sacramento River, Cal.:
  - Bridge at Tehama I, 666
  - Improvement of, including report of Board I, 608; IV, 3420, 3423
  - Improvement of, by California Débris Commission I, 656; V, 3625
- Sag Bay, N. Y., bridge across inlet connecting Sag Harbor Cove and I, 662
- Sag Harbor Cove, N. Y., bridge across inlet connecting Sag Bay and I, 662
- Saginaw River, Mich., improvement of I, 555; IV, 3139
- St. Augustine Harbor, Fla.:
  - Defenses of I, 26, 825
  - Improvement of I, 338; II, 1741
- St. Clair County, Mich., bridge across Belle River in I, 666
- St. Clair River and St. Clair Flats Canal, Mich.:
  - Examination and survey of canal I, 571; IV, 3203, 3206
  - Improvement of I, 568; IV, 3188
  - Improvement of channels in waters connecting Great Lakes I, 563; IV, 3157
  - Operating and care of canal I, 568; IV, 3189
  - Removal of wreck in the rapids I, 570; IV, 3198
  - Surveys (*see* Northern and Northwestern Lakes) I, 677; V, 3761
- St. Croix Lake and River, Wis. and Minn., improvement of I, 446; III, 2329
- St. Croix River, Me., repair of piers below Calais I, 120
- St. Francis River, Ark., improvement of I, 432; III, 2126
- St. George Sound, Fla. *See* Carrabelle Bar and Harbor.
- St. Johns River, Fla.:
  - Defenses of I, 6, 26, 825
  - Improvement between Jacksonville and the ocean I, 335; II, 1733
  - Improvement between Jacksonville and Palatka, including Orange Mills Flats I, 336; II, 1737
  - Improvement of Volusia Bar I, 337; II, 1739
  - Removal of water hyacinths I, 341; II, 1746
- St. Jones River, Del., improvement of I, 256; II, 1343
- St. Joseph Harbor, Mich.:
  - Bridge across St. Joseph River I, 660
  - Improvement of I, 537; IV, 3079

St. Joseph Harbor, Mo.:
  Improvement by Missouri River Commission ...... I, 658; S., 365, 382
  Plan and estimate for rectification of Missouri River at ...... I, 452; III, 2367
St. Joseph River, Mich.:
  Bridge at St. Joseph ...... I, 660
  Improvement of ...... I, 538; IV, 3083
St. Lawrence Power Company's canal (*see* Grass *and* St. Lawrence rivers) ...... I, 599; IV, 3377, 3389
St. Lawrence River, N. Y.:
  Cape Vincent Harbor, improvement of ...... I, 597; IV, 3370
  Examination and survey at Long Sault Island ...... I, 599; IV, 3389, 3391
  Ogdensburg Harbor, improvement of ...... I, 598; IV, 3374
  Ogdensburg to foot of Lake Ontario, removal of shoals ...... I, 597; IV, 3373
  Surveys (*see* Northern and Northwestern Lakes) ...... I, 677; V, 3761
St. Louis and Southern Illinois Railway Company, bridge of ...... I, 667
St. Louis Bay and River, Minn. and Wis. (*see* Duluth Harbor) ...... I, 507; IV, 2828
St. Louis Harbor, Mo.:
  Discharge measurements ...... III, 2199
  Improvement of ...... I, 438; III, 2198
St. Marys River and St. Marys Falls Canal, Mich.:
  Commercial statistics ...... I, 565; IV, 3173
  Improvement of channels in waters connecting Great Lakes ...... I, 563; IV, 3157
  Improvement of Hay Lake Channel ...... I, 567; IV, 3185
  Improvement of river at the falls ...... I, 564; IV, 3161
  Operating and care of canal ...... I, 565; IV, 3173
  Preliminary report on survey, including Hay Lake Channel ...... I, 570; IV, 3200
  Surveys (*see* Northern and Northwestern Lakes) ...... I, 677; V, 3761
St. Paul, Minn., gauging Mississippi River at ...... I, 449; III, 2340
St. Peters (Minnesota) River, Minn.:
  Improvement of ...... I, 447; III, 2334
  Survey of Big Stone and Traverse lakes for reservoir dams to improve navigation on ...... I, 450; III, 2342
Sakonnet Habor, Point, and River, R. I.:
  Examination and survey of rocks in harbor ...... I, 175; II, 1148, 1150
  Increasing width and depth of draw opening in Stone Bridge ...... I, 165; II, 1124
  Rebuilding and extending breakwater at Sakonnet Point ...... I, 166; II, 1126
Salmon Bay, Wash., improvement of waterway via ...... I, 646; V, 3583
Salmon Creek, N. Y. (*see* Pultneyville Harbor) ...... I, 594; IV, 3359
Salmon River, Conn., bridge below Leesville, East Haddam ...... I, 662
Sampit River, S. C. (*see* Georgetown Harbor) ...... I, 314; II, 1581
San Antonio Estuary, Cal. *See* Oakland Harbor.
Sand batteries, emergency ...... I, 8
Sandbeach, Mich.:
  Improvement of harbor of refuge ...... I, 557; IV, 3144
  Water levels ...... I, 681; V, 3776
San Diego Harbor, Cal.:
  Defenses of ...... I, 6, 33, 856, 922
  Improvement of ...... I, 599; IV, 3395
Sand Island, Ohio River, Ky., examination relative to purchase of ...... I, 505; IV, 2817
Sandusky Harbor, Ohio:
  Engineering methods used in improvement of ...... IV, 3213
  Examination and survey ...... I, 585; IV, 3270, 3275
  Improvement of ...... I, 574; IV, 3230
  Removal of wreck ...... I, 584; IV, 3269
Sandy Bay, Mass., construction of harbor of refuge ...... I, 141; II, 1048
Sandy Hook, N. J., removal of wreck at ...... I, 229; II, 1299
Sandy Lake, Minn.:
  Construction of reservoir dam ...... I, 444; III, 2309
  Operating and care of reservoir dam ...... I, 445; III, 2322
San Francisco Bay and Harbor, Cal.:
  Defenses of ...... I, 6, 33, 860
  Examination and survey of Oakland Harbor ...... I, 613; IV, 3434, 3445
  Harbor lines ...... I, 119; IV, 3460
  Improvement of Oakland Harbor ...... I, 605; IV, 3413
  Removal of Arch and Shag rocks ...... I, 604; IV, 3411
  Removal of wreck in bay ...... I, 613; IV, 3434
Sanitary District of Chicago, Ill.:
  *See also* Chicago Drainage Canal.
  Bridges of, across Chicago River ...... I, 662

- San Jacinto River, Tex.:
  - Improvement of (*see* Galveston ship channel) ... i, 404; iii, 1933
  - Removal of wreck of tug *Kate* ... i, 411; iii, 1959
- San Joaquin County, Cal.:
  - Bridge of, across Burns Cut-off, San Joaquin River ... i, 664
  - Bridge of, across San Joaquin River at Brandts Ferry ... i, 661
  - Bridge of, across San Joaquin River at Durhams Ferry ... i, 664
- San Joaquin River, Cal.:
  - Bridge at Brandts Ferry ... i, 661
  - Bridge across Burns Cut-off ... i, 664
  - Bridge at Durhams Ferry ... i, 664
  - Bridge at Hills Ferry ... i, 666
  - Examination above mouth of Stanislaus River for closure of certain sloughs ... i, 613; iv, 3454
  - Examination and survey from Antioch, through Suisun Bay, to Karquines Strait ... i, 613; iv, 3449, 3452
  - Improvement of ... i, 606; iv, 3416
  - Improvement of, by California Débris Commission ... i, 656; v, 3625
- San Juan Harbor, Porto Rico:
  - Defenses of ... i, 6, 36, 909
  - Removal of wreck ... i, 657; v, 3635
- San Leandro Bay, Cal. *See* Oakland Harbor.
- San Luis Obispo Harbor, Cal., improvement of ... i, 602; iv, 3401
- San Pedro Bay and Harbor, Cal.:
  - Construction of deep-water harbor ... i, 600; iv, 3397
  - Improvement of Wilmington inner harbor ... i, 601; iv, 3399
- Santee River, S. C., improvement of ... i, 316; ii, 1587
- Sarasota Bay, Fla., improvement of ... i, 344; iii, 1753
- *Satanella* (barge), removal of wreck of ... i, 223; ii, 1247
- Saugatuck Harbor, Mich., improvement of Kalamazoo River at ... i, 540, 541; iv, 3087, 3090
- Saugatuck River, Conn., improvement of ... i, 189; ii, 1180
- Saugerties Harbor, N. Y., improvement of ... i, 211; ii, 1227
- Saugus River, Mass.:
  - Examination and survey of Lynn Harbor ... i, 159; ii, 1092, 1093
  - Improvement of Lynn Harbor ... i, 150; ii, 1075
- Sauk River, Wis. (*see* Port Washington Harbor) ... i, 521; iv, 2934
- Sault Ste. Marie, Mich.:
  - *See also* St. Marys River.
  - Commerce passing canals at ... i, 565, iv, 3173
  - Water levels ... i, 681; v, 3776
- Sausal Creek, Cal. *See* Oakland Harbor.
- Savannah, Ga., engineer district, engineering methods used in the ... ii, 1660
- Savannah Harbor and River, Ga.:
  - Defenses of ... i, 6, 26, 821
  - Engineering methods used in improvement of ... ii, 1660
  - Examination and plan and estimate for improvement of harbor ... i, 334; ii, 1719, 1723
  - Harbor lines at Savannah ... i, 119; ii, 1730
  - Improvement of harbor ... i, 324; ii, 1628
  - Improvement of river above Augusta ... i, 327; ii, 1636
  - Improvement of river between Augusta and Savannah ... i, 326; ii, 1634
  - Improvement of waterway to Beaufort, S. C ... i, 324; ii, 1628
  - Improvement of waterway to Fernandina, Fla ... i, 332; ii, 1653
  - Removal of wrecks ... i, 334; ii, 1660
- Sayville, N. Y., improvement of Browns Creek ... i, 209; ii, 1219
- Schuylkill River, Pa.:
  - Bridge at Grays Ferry, Philadelphia ... i, 665
  - Improvement of ... i, 233; ii, 1319
  - Removal of wrecks ... i, 262, 263; ii, 1350, 1352
- Scituate Harbor, Mass., improvement of ... i, 156; ii, 1085
- Scrapers, road, application of, to grading river banks to receive revetments ... iii, 2225
- Scuppernong River, N. C., examination and survey ... i, 309; ii, 1541, 1543
- Seabright, N. J.:
  - Bridge across Shrewsbury River at ... i, 663
  - Harbor lines in Shrewsbury River at ... i, 118; ii, 1282
  - Removal of wreck in Atlantic Ocean off ... i, 223; ii, 1247
- Seabrook Beach, Me., bridge across Hampton River ... i, 666
- Seacoast defenses. *See* Fortifications.

Searchlights .... I, 13, 37
Seattle, Wash., waterway from Puget Sound to Lake Washington .... I, 646; V, 3583
Seattle and International Railway Company, bridge of .... I, 667
Seattle and Montana Railroad Company, bridge of .... I, 663
Sea walls .... I, 11, 37
Sebewaing River, Mich., improvement of .... I, 557; IV, 3142
Secretary Creek (Warwick River), Md., improvement of .... I, 268; II, 1383
Seekonk (Pawtucket) River, R. I.:
  Examination of .... I, 175; II, 1152
  Improvement of .... I, 166; II, 1127
Selma, Ala., bridge across Alabama River at .... I, 665
Service of officers of the Corps of Engineers in the field, with troops, and as officers of U. S. volunteers, since April, 1898 .... I, 45
Severn River, Md., harbor lines at Annapolis .... I, 119; II, 1396
Sewells Bridge, across York River, Me .... I, 667
Shag Rocks, San Francisco Harbor, Cal., removal of .... I, 604; IV, 3411
Shaws Cove, New London, Conn. (*see* Thames River) .... I, 178; II, 1163
Sheboygan Harbor, Wis., improvement of .... I, 521; IV, 2931
Sherman, General, statue of .... I, 676; V, 3689
Shilshole Bay, Wash., improvement of waterway via .... I, 646; V, 3583
Ship Island Harbor and Pass, Miss.:
  Improvement of channel to Gulfport .... I, 374; III, 1846
  Improvement of pass .... I, 374; III, 1848
Ship John light, Delaware Bay, removal of wreck .... I, 263; II, 1350
Shoal Harbor, N. J., improvement of .... I, 220; II, 1242
Shoalwater Bay (Willapa Harbor), Wash., improvement of .... I, 641; V, 3577
Shovelful light-ship, Mass., removal of wreck near .... I, 174; II, 1147
Shreveport, La.:
  Examination of Red River to Denison, Tex .... I, 425; III, 2073
  Improvement of waterway to Jefferson, Tex. (*see* Cypress Bayou) . I, 414; III, 2033
Shrewsbury River, N. J.:
  Bridge at Seabright .... I, 663
  Harbor lines at Seabright .... I, 118; II, 1282
  Improvement of .... I, 221; II, 1243
  Removal of wreck opposite Island Beach .... I, 223; II, 1247
Sinepuxent Bay, Md., improvement of waterway via .... I, 260; II, 1348
*Siner, David* (schooner), removal of wreck of .... I, 174; II, 1147
Sioux City, Iowa:
  Construction of ice harbor in Big Sioux River .... I, 456; III, 2373, 2377
  Examination of Big Sioux River for reservoir dam .... I, 458; III, 2395
  Improvement of Missouri River at and above .... I, 452, 455; III, 2373, 2376
  Monument to Sergt. Charles Floyd near .... I, 687; V, 3827
  Snagging Upper Missouri River .... I, 457; III, 2391
Sioux River, S. Dak.:
  Construction of ice harbor at Sioux City .... I, 456; III, 2373, 2377
  Examination for reservoir dam .... I, 458; III, 2395
Sites for fortifications .... I, 12, 37
Siuslaw River, Oreg., improvement of mouth .... I, 619; V, 3478
Six-mile Island, Allegheny River, Pa., construction of lock and dam. I, 482; IV, 2701
Skagit River, Wash. (*see* Puget Sound) .... I, 645; V, 3581
Skiddaway Narrows, Ga., examination of .... I, 335; II, 1728
Slack-water systems. *See* Canals *and* Waterways.
Smyrna River, Del.:
  Examination and survey .... I, 263; II, 1361, 1363
  Improvement of .... I, 252, II, 1340
  Removal of wreck .... I, 263; II, 1352
Snag boats:
  For works in Florida .... I, 342; II, 1749
  For works on Texas coast .... I, 408; III, 1950
Snake River, Idaho, Oreg., and Wash.:
  Examination and survey from head of navigation to mouth. I, 629; V, 3525, 3529
  Improvement up to Asotin, Wash .... I, 623; V, 3489
  Road from Buffalo Fork to Fort Washakie, Wyo .... I, 686; V, 3823
Snohomish River, Wash.:
  Improvement of Everett Harbor .... I, 648; V, 3587
  Improvement of (*see* Puget Sound) .... I, 645; V, 3581
Snoqualmie River, Wash. (*see* Puget Sound) .... I, 645; V, 3581
Soda Lakes, La. (*see* Cypress Bayou) .... I, 414; III, 2033

- South Arm, Mich., bridge of town of I, 666
- South Arm of Pine Lake, Mich., bridge across I, 666
- South Atlantic States, removal of water hyacinths from Florida waters. I, 341; II, 1746
- South Branch, Chicago River, Ill.:
  - Bridge across West Fork at Mud Lake, Chicago I, 663
  - Improvement of I, 529; IV, 2992
  - Waterway from Mississippi River to Lake Michigan, via, examination for, with plan and estimate (act of 1900) I, 534; IV, 3058
  - Waterway from Mississippi River to Lake Michigan, via, survey for (act of 1899) I, 534; IV, 3048
- South Carolina, defenses of coast of I, 6, 25, 816
- South Chicago, Ill. (*see* Calumet Harbor) I, 529; IV, 2995
- Southern Branch Drawbridge Company, bridge of I, 665
- Southern Branch, Elizabeth River, Va.:
  - Bridge across I, 665
  - Improvement of Norfolk Harbor and its approaches I, 292; II, 1447
  - Improvement of waterway to Albemarle Sound, via Currituck Sound I, 297; II, 1457
  - Improvement of waterway to sounds of North Carolina, via Pasquotank River I, 296; II, 1455
- Southern Pacific Company, bridge of I, 666
- Southern Railway Company:
  - Bridge of I, 662
  - Examination and plan and estimate for improvement of Norfolk Harbor at pier of I, 299; II, 1463, 1466
- South Fork of South Branch, Chicago River, Ill., improvement of I, 529; IV, 2992
- South Haven Harbor, Mich., improvement of I, 538; IV, 3084
- South Hero Island, Lake Champlain, Vt., improvement of channel between North Hero Island and I, 146
- South Mills, N. C.:
  - Examination and survey of waterway to and including Ocracoke and Beaufort inlets I, 299, 309; II, 1511
  - Improvement of waterway via I, 296; II, 1455
- South Milwaukee Harbor, Wis., improvement of I, 523; IV, 2942
- South Norwalk, Conn. (*see* Norwalk) I, 191; II, 1181
- South Pass, Mississippi River, La.:
  - Maintenance of channel by representatives of James B. Eads. I, 118, 379; III, 1865
  - Maintenance of channel by United States I, 385; III, 1881
- Southport, N. C., harbor lines in Cape Fear River at I, 119; II, 1572
- South River, N. J., improvement of I, 217; II, 1237
- Southwest Pass, Mississippi River, La., project for improvement of. I, 383, 384; III, 1878
- Springdale, Pa., construction of lock and dam in Allegheny River I, 482; IV, 2701
- Spring Garden, Baltimore, Md., improvement of harbor at I, 266; II, 1379
- Springwells Township, Mich., bridge of, across Rouge River I, 664
- Spuyten Duyvil Creek, N. Y. (*see* Harlem River) I, 206; II, 1214
- Squan (Manasquan) River, N. J., improvement of I, 222; II, 1245
- Stage Harbor, Mass.:
  - Improvement of Chatham Harbor I, 158; II, 1090
  - Removal of wreck on Hardings Beach I, 174; II, 1147
- Stamford Harbor, Conn., improvement of I, 194; II, 1184
- Stanislaus County, Cal., bridge of I, 666
- Staten Island-New Jersey channel:
  - Harbor lines in Arthur Kill I, 118; II, 1279
  - Improvement of I, 215; II, 1233
  - Removal of wreck near Corner Stake light I, 223; II, 1247
- Staten Island Sound (Arthur Kill), N. Y. and N. J.:
  - Harbor lines I, 118; II, 1279
  - Improvement of Staten Island-New Jersey channel I, 215; II, 1233
- Statistics of commerce, Sault Ste. Marie canals, Mich I, 565; IV, 3173
- Statues, Washington, D. C I, 676; V, 3689
- Statutes of Fifty-sixth Congress, second session, affecting Corps of Engineers V, 3837
- Steamboats. *See* Dredge, Snag, *and* Tug boats, *and* Wrecks.
- Stilaguamish River, Wash.:
  - Bridge near Arlington I, 667
  - Improvement of (*see* Puget Sound) I, 645; V, 3581
- Still Bluff, N. C., bridge across Black River at I, 661
- Stillwater Harbor, Minn. (*see* St. Croix River) I, 446; III, 2329

Stockbridge Landing, Lake Winnebago, Wis. (*see* Fox River) ........ I, 525; IV, 2953
Stone Bridge, Sakonnet River, R. I., increasing width and depth of draw opening ........ I, 165; II, 1124
Stonington, Conn., construction of harbor of refuge ........ I, 177; II, 1161
Storm of September, 1900:
  Brazos River, Tex., damage to jetties ........ I, 412; III, 2022
  Galveston, Tex., damage to fortifications ........ I, 32, 850
  Galveston, Tex., damage to jetties and main ship channel ........ I, 412; III, 2018
  Sabine Pass, Tex., damage at ........ I, 402; III, 1919
*Storm* (steamboat), removal of wreck of ........ I, 473; IV, 2646
Stratham, N. H., bridge across Exeter River at ........ I, 668
Sturgeon Bay and Lake Michigan Canal, Wis.:
  Construction of harbor of refuge ........ I, 518; IV, 2922
  Examination and survey ........ I, 527; IV, 2970, 2973
  Improvement of ........ I, 517; IV, 2914
  Operating and care ........ I, 518; IV, 2919
  Removal of wreck ........ I, 527; IV, 2970
Subaqueous bank protection, use of lumber mattress for ........ III, 2212
Submarine mines ........ I, 5, 12, 38, 695
*Success* (sloop), removal of wreck of ........ I, 223; II, 1247
Suffolk County, N. Y., bridge of ........ I, 662
Suisun Bay, Cal., examination and survey of San Joaquin River from Antioch to Karquines Strait, through ........ I, 613; IV, 3449, 3452
Sullivan Falls Harbor, Me., improvement of ........ I, 123; II, 992
Sullivan Island shore, Charleston, S. C., improvement at ........ I, 320; II, 1598
Sullivan River, Me., improvement of Sullivan Falls Harbor ........ I, 123; II, 992
Sulphur River, Ark. and Tex.:
  Bridge across ........ I, 660
  Improvement of (*see* Red River) ........ I, 412; III, 2025
unken craft. *See* Wrecks.
Superior Bay and Harbor, Wis.:
  Improvement of ........ I, 507; IV, 2828
  Notes on rock found in vicinity of Duluth, Minn ........ IV, 2883
  Removal of wreck in Duluth Harbor ........ I, 514; IV, 2883
Superior Lake:
  *See also* Northern and Northwestern Lakes.
  Commercial statistics, Sault Ste. Marie canals, Mich ........ I, 565; IV, 3173
  Improvement and operating and care of waterway to Keweenaw Bay ........ I, 511, 512; IV, 2867
  Notes on rock found in vicinity of Duluth, Minn ........ IV, 2883
  Preliminary report on survey of waters connecting Lake Huron and ........ I, 570; IV, 3200
  Water levels ........ I, 681; V, 3776
Surveys:
  In military divisions and departments ........ I, 683; V, 3799
  Northern and Northwestern Lakes ........ I, 677, 681; V, 3761
  Of rivers and harbors, estimate of appropriation for ........ I, 656
  Of waterways between Great Lakes and Atlantic Ocean, disbursements for ........ I, 118
Susquehanna River, Md.:
  Examination and survey of rocks near entrance to Havre de Grace Harbor ........ I, 273; II, 1392, 1393
  Improvement above and below Havre de Grace ........ I, 264; II, 1374
Suwanee River, Fla., improvement of ........ I, 349; III, 1762
Swinomish Slough, Wash., improvement of ........ I, 651; V, 3589
Synepuxent Bay, Md., improvement of waterway via ........ I, 260; II, 1348

T.

Tacoma Harbor, Wash.:
  Bridge across Puyallup River ........ I, 666
  Examination and survey ........ I, 655; V, 3593, 3595
Tallahatchie River, Miss., improvement of ........ I, 422; III, 2067
Tampa Bay and Harbor, Fla.:
  Defenses of ........ I, 6, 27, 829
  Harbor lines in Hillsboro River at Tampa ........ I, 119; III, 1763
  Improvement of bay ........ I, 345; III, 1756
  Improvement of Hillsboro Bay and River ........ I, 347; III, 1758
Tangier Sound, Md., removal of wreck at Deals Island ........ I, 272; II, 1390

- Tar River, N. C., improvement of ..... I, 301; II, 1487
- Taunton River, Mass.:
  - Improvement of ..... I, 164; II, 1122
  - Improvement of Fall River Harbor ..... I, 169; II, 1134
- Tchefuncte River, La., improvement of ..... I, 379; III, 1872
- Teche Bayou, La.:
  - Improvement of ..... I, 391; III, 1899
  - Removal of water hyacinths ..... I, 395; III, 1906
- Technical methods. *See* Engineering methods.
- Tehama, Cal., bridge across Sacramento River ..... I, 666
- Telegraph line, Executive Departments, Washington, D. C ..... I, 676; V, 3689
- Tennessee River:
  - Chattanooga, Tenn., improvement above ..... I, 464; III, 2419, 2421
  - Chattanooga, Tenn., to Riverton, Ala., improvement ..... I, 464, 465; III, 2419, 2423
  - Chattanooga, Tenn., to Riverton, Ala., survey from ..... I, 470
  - Decatur, Ala., bridge at ..... I, 662
  - Gauging (*see* Mississippi River) ..... I, 425; III, 2072; S., 8, 45, 126
  - Muscle Shoals Canal, Ala., operating and care ..... I, 466; III, 2440
  - Riverton, Ala., improvement below ..... I, 464, 466; III, 2419, 2428
- Tensas River, La., improvement of ..... I, 419; III, 2046
- Terraceia Cut-off, Fla. (*see* Manatee River) ..... I, 345; III, 1755
- Texas, dredge and snag boat for works on coast of ..... I, 408; III, 1950
- Texas City, Tex., deepening channel to Galveston ..... I, 403; III, 1930
- Thames River, Conn., improvement of ..... I, 178; II, 1163
- The Board of Engineers ..... I, 5, 691
- *Thompson, Frank* (barge), removal of wreck of ..... I, 272; II, 1391
- Thoroughfare, Inside, Atlantic City, N. J., bridge across ..... I, 664
- Three-mile Rapids, Columbia River, Oreg. and Wash., improvement at. I, 625; V, 3491
- Thunder Bay River, Mich. (*see* Alpena Harbor) ..... I, 555; IV, 3137
- Tickfaw River, La., improvement of, including tributaries ..... I, 380; III, 1873
- Tillamook Bay and Bar, Oreg., improvement of ..... I, 622; V, 3485
- Tiverton, R. I., alteration of Stone Bridge across Sakonnet River ..... I, 165; II, 1124
- Toledo Harbor, Ohio:
  - Bridges across Maumee River ..... I, 667
  - Engineering methods used in improvement of ..... IV, 3213
  - Improvement of ..... I, 572; IV, 3218
- Tolomato River, Fla. (*see* St. Augustine Harbor) ..... I, 338; II, 1741
- Tombigbee River, Ala. and Miss.:
  - Columbus to Fulton, Miss., improvement from ..... I, 369; III, 1824, 1837
  - Demopolis, Ala., below, improvement of ..... I, 367; III, 1824, 1835
  - Demopolis, Ala., to Columbus, Miss., improvement from ..... I, 368; III, 1824, 1836
  - Fulton to Walkers Bridge, Miss., improvement from ..... I, 370; III, 1824, 1839
  - Mouth of Warrior River, just below, examination and survey for lock and dam ..... I, 378; III, 1858, 1861
- Tonawanda Harbor, N. Y., improvement of ..... I, 590; IV, 3335
- Tongue Point, Columbia River, Oreg., improvement below ..... I, 634; V, 3565
- Tonnage, Sault Ste. Marie canals, Mich ..... I, 565; IV, 3173
- Torpedoes ..... I, 5, 12, 38, 695
- Totten, Fort, N. Y., post of ..... I, 38, 927
- Town Creek, Brunswick County, N. C., improvement of ..... I, 308; II, 1509
- Town River, Mass., improvement of ..... I, 154; II, 1083
- Trail Creek, Ind. (*see* Michigan City Harbor) ..... I, 534; IV, 3074
- Traverse Lake, Minn. and S. Dak., survey for reservoir dam ..... I, 450; III, 2342
- Trent River, N. C.:
  - Examination and survey between Newbern and Trenton ..... I, 310; II, 1545, 1550
  - Improvement of ..... I, 302; II, 1490
- Trenton, Mich. (*see* Detroit River) ..... I, 571; IV, 3208
- Trenton, N. J., bridge across Delaware River at ..... I, 661
- Trenton, N. C., examination and survey of Trent River between Newbern and ..... I, 310; II, 1545, 1550
- Trinity River, Tex.:
  - Examination from Dallas to Fort Worth ..... I, 411; III, 1970
  - Improvement of (*see also* Brazos River) ..... I, 405, 408; III, 1938, 1950
- Troops:
  - Engineer, distribution, duties, etc., of ..... I, 39, 41, 42, 943
  - Engineer equipment of ..... I, 37, 38, 943
  - Service of engineer officers with, since April, 1898 ..... I, 45

- Troy, N. Y.:
  - Bridge across Hudson River at .... I, 669
  - Harbor lines in Hudson River at .... I, 118; II, 1268
- Tugboats:
  - *See also* Wrecks.
  - For transfer to the artillery .... I, 38
- Tug Fork, Big Sandy River, W. Va. and Ky.:
  - Final report on survey for locks and dams .... I, 496; IV, 2750
  - Improvement of .... I, 493; IV, 2742
- Tukeys Bridge, Portland, Me., obstructing Back Cove .... I, 665
- Tunnel, Washington Aqueduct, D. C., construction of .... I, 673; V, 3666
- Turners Cut, N. C.:
  - Examination and survey of waterway from South Mills to and including Ocracoke and Beaufort inlets, via .... I, 299, 309; II, 1511
  - Improvement of waterway via .... I, 296; II, 1455
- Turrets .... I, 7
- Turtle River, Ga. (*see* Brunswick Harbor) .... I, 331; II, 1649
- Twelve-mile Creek, N. Y. (*see* Wilson Harbor) .... I, 592; IV, 3353
- Twin Rivers, Wis. (*see* Two Rivers Harbor) .... I, 520; IV, 2927
- Two Harbors, Minn.:
  - Examination and survey of Burlington Bay .... I, 514; IV, 2889, 2897
  - Improvement of Agate Bay .... I, 506; IV, 2824
- Two Rivers Harbor, Wis., improvement of .... I, 520; IV, 2927

## U.

- Union Bridge Company, bridge of .... I, 665
- Union Lake, Wash., improvement of waterway via .... I, 646; V, 3583
- *Union* (lighter), removal of wreck of .... I, 223; II, 1248
- Union River, Me., improvement of .... I, 124; II, 993
- United States Engineer School .... I, 38, 42, 937
- United States Navy Department, bridge of, between Portsmouth Navy-Yard, N. H., and Kittery, Me. .... I, 664
- United States volunteers, service of officers of the Corps of Engineers as officers of, since April, 1898 .... I, 45
- Urbana Creek, Va., improvement of .... I, 283; II, 1414

## V.

- Vanland Landing, Yazoo River, Miss., removal of wreck .... I, 420; III, 2048
- Vaughan Bridge, Portland, Me., obstructing Fore River .... I, 668
- Vermilion Bayou, La., improvement of channel, bay, and passes .... I, 391; III, 1900
- Vermilion Harbor, Ohio, improvement of .... I, 577; IV, 3239
- Vessels. *See* Dredge, Snag, *and* Tug boats, *and* Wrecks.
- *Vetra, Sarah E.* (schooner), removal of wreck of .... I, 272; II, 1391
- Vicksburg Harbor, Miss., improvement of .... I, 421; III, 2052
- Vidalia Harbor, La. (*see* Mississippi River Commission) .... I, 657; S., 3, 32
- Vinalhaven, Me., improvement of Carvers Harbor .... I, 129; II, 1003
- Vineyard Haven, Mass., improvement of harbor at .... I, 162; II, 1115
- Vineyard Sound, Mass., removal of wreck near Robinsons Hole .... I, 174; II, 1147
- Vining, J. P., et al., bridge of .... I, 666
- Volunteers, U. S., service of officers of the Corps of Engineers as officers of, since April, 1898 .... I, 45
- Volusia Bar, St. Johns River, Fla., improvement of .... I, 337; II, 1739

## W.

- Wabash River, Ind. and Ill.:
  - Improvement above Vincennes, Ind .... I, 499, 501; IV, 2801
  - Improvement below Vincennes, Ind .... I, 499, 500; IV, 2800
  - Operating and care of Grand Rapids lock and dam .... I, 501; IV, 2802
- Waccamaw River, N. C. and S. C., improvement of .... I, 310; II, 1573
- Wakefield, Va., wharf at Bridge Creek Landing, near .... I, 676; V, 3689
- Walden Slough, San Joaquin River, Cal., examination for closure of. I, 613; IV, 3454
- Wallabout Channel, N. Y., improvement of .... I, 208; II, 1218
- Wappoo Cut, S. C., improvement of .... I, 322; II, 1603
- Wareham Harbor, Mass., bridge across Weweanititt River .... I, 667
- War maps .... I, 683, 685; V, 3799

- Warrior River, Ala.:
  - Examination and survey for Locks and Dams 1, 2, and 3, below Tuscaloosa .......... I, 378; III, 1858, 1861
  - Improvement above Tuscaloosa .......... I, 365; III, 1816
  - Improvement below Tuscaloosa .......... I, 366; III, 1824
  - Operating and care of locks and dams above Tuscaloosa .......... I, 366; III, 1819
- Warroad Harbor and River, Minn.:
  - Examination of .......... I, 451; III, 2356
  - Improvement of bar at mouth of river .......... I, 449; III, 2339
- Warwick River, Md., improvement of .......... I, 268; II, 1383
- Washakie, Fort, Wyo., road to Buffalo Fork, Snake River .......... I, 686; V, 3823
- Washington, D. C.:
  - Aqueduct Bridge, repair of .......... I, 669; V, 3637
  - Aqueduct, Dalecarlia Reservoir .......... I, 671; V, 3651
  - Aqueduct, filtration plant .......... I, 674; V, 3680
  - Aqueduct, increasing water supply .......... I, 673; V, 3666
  - Aqueduct, maintenance and repair .......... I, 671; V, 3651
  - Aqueduct Tunnel and Howard University Reservoir .......... I, 673; V, 3666
  - Barracks, removal of engineer troops and school to .......... I, 42
  - Defenses of .......... I, 6, 23, 791
  - Government Printing Office, building for use of .......... I, 685; V, 3801
  - Highway bridge across Potomac River, plans, etc., for .......... I, 119
  - Improvement of Potomac River at .......... I, 273; II, 1399
  - Improvement of Potomac River below .......... I, 276; II, 1405
  - Long Bridge, across Potomac River, rebuilding of .......... I, 275; II, 1399
  - Mall, the, and Potomac and Zoological parks .......... I, 676; V, 3689
  - Memorial Bridge .......... I, 670; V, 3648
  - Public buildings and grounds, and Washington Monument .......... I, 675; V, 3689
  - Telegraph line connecting Executive Departments, etc .......... I, 676; V, 3689
- Washington, N. C.:
  - Harbor lines in Pamlico River at .......... I, 119; II, 1570
  - Improvement of Pamlico River .......... I, 301; II, 1487
- Washington Barracks, D. C., removal of engineer troops and school to .......... I, 42
- Washington County, Ohio, bridge of .......... I, 660
- Washington Lake, Wash., improvement of waterway to Puget Sound .......... I, 646; V, 3583
- Washington Monument, D. C .......... I, 675; V, 3689
- Washita (Ouachita) River, Ark. and La.:
  - Examination of Camden Harbor, Ark .......... I, 425; III, 2090
  - Improvement of .......... I, 415; III, 2034
- Wateree River, S. C., improvement of .......... I, 317; II, 1590
- Water hyacinths:
  - Removal of, from Florida waters .......... I, 341; II, 1746
  - Removal of, from Louisiana waters .......... I, 395; III, 1906
- Water-level observations:
  - Columbia River, Oreg. and Wash .......... I, 640; V, 3576
  - Mississippi River and principal tributaries .......... I, 425; III, 2072; S., 8, 45, 126
  - Mississippi River, at St. Louis, Mo., illustration of full-depth rod-float method of discharge measurement .......... III, 2199
  - Mississippi River, at St. Paul, Minn .......... I, 449; III, 2340
  - Northern and Northwestern Lakes .......... I, 681; V, 3776
- Waters, navigable. *See* Bridges, Rivers and harbors, *and* Wrecks.
- Waterways (*see also* Canals):
  - Beaufort, N. C., to Newbern .......... I, 303; II, 1493
  - Beaufort, N. C., to New River .......... I, 304; II, 1496
  - Charleston to Beaufort, S. C., sunken logs .......... I, 324; II, 1607
  - Chincoteague Bay, Va., to Delaware Bay, Del .......... I, 260; II, 1348
  - Delaware and Chesapeake Canal, Md., sunken logs .......... I, 272; II, 1390
  - Galveston to Houston, Tex .......... I, 404; III, 1933
  - Great Lakes to Atlantic Ocean .......... I, 118
  - Keweenaw Bay to Lake Superior, Mich .......... I, 511, 512; IV, 2867
  - Kissimmee River, Fla., to Gulf of Mexico .......... I, 350
  - Mississippi River to Lake Michigan (act of 1899) .......... I, 534; IV, 3048
  - Mississippi River to Lake Michigan (act of 1900) .......... I, 534; IV, 3058
  - Norfolk, Va., to Albemarle Sound, N. C., via Currituck Sound .......... I, 297; II, 1457
  - Norfolk, Va., to sounds of North Carolina, via Pasquotank River .......... I, 296; II, 1455
  - Portage Lake and Lake Superior canals (*see* Keweenaw Point) .......... I, 511, 512; IV, 2867
  - Puget Sound to lakes Union and Washington, Wash .......... I, 646; V, 3583

Waterways, etc.—Continued.
  San Joaquin River, Cal., to Karquines Strait ........ I, 613; IV, 3449, 3452
  Savannah, Ga., to Beaufort, S. C ........ I, 324; II, 1628
  Savannah, Ga., to Fernandina, Fla ........ I, 332; II, 1653
  Shreveport, La., to Jefferson, Tex. (*see* Cypress Bayou) ........ I, 414; III, 2033
  South Mills, N. C., to and including Ocracoke and Beaufort inlets ........ I, 299, 309; II, 1511
  Superior Lake to Lake Huron, including Hay Lake Channel, St. Marys River ........ I, 570; IV, 3200
Waukegan Harbor, Ill., improvement of ........ I, 524; IV, 2951
Western Branch, Elizabeth River, Va., improvement of ........ I, 293; II, 1449
West Fork of South Branch, Chicago River, Ill.:
  Bridge across Mud Lake, Chicago ........ I, 663
  Improvement of ........ I, 529; IV, 2992
West Galveston Bay, Tex., improvement of ........ I, 406, 408; III, 1939, 1950
West Palmbeach, Fla., bridge across Lake Worth ........ I, 667
Westport Harbor, Conn., improvement of ........ I, 189; II, 1180
Weweanititt River, Mass., bridges across ........ I, 667
Weymouth River, Mass., improvement of ........ I, 155; II, 1084
Whatcom Creek Waterway, Wash., bridge at New Whatcom ........ I, 663
Whitehall Harbor, N. Y. (*see* Champlain Lake) ........ I, 148; II, 1055
White House, Washington, D. C ........ I, 675; V, 3689
White Lake Harbor, Mich., improvement of ........ I, 546; IV, 3107
White River, Ark.:
  Gauging (*see* Mississippi River) ........ I, 425; III, 2072; S., 8, 45, 126
  Improvement by open-channel work ........ I, 427; III, 2105
  Improvement of Buffalo Fork ........ I, 429; III, 2119
  Improvement of upper river by locks and dams ........ I, 428; III, 2108
White River, Ind., improvement of ........ I, 501; IV, 2804
Wicomico River, eastern shore of Maryland, improvement of ........ I, 270; II, 1386
*Wilhelmina, Laura* (sloop), removal of wreck of ........ I, 272; II, 1390
Willamette River, Oreg.:
  Improvement above Portland ........ I, 631; V, 3550
  Improvement below Portland ........ I, 633; V, 3557
Willapa River and Harbor, Wash., improvement of ........ I, 641; V, 3577
Willets Point, N. Y.:
  Battalion of Engineers ........ I, 39, 43, 943, 975
  Engineer Depot ........ I, 40, 41, 42, 947
  Engineer School ........ I, 38, 42, 937
  Engineer troops ........ I, 39, 41, 42, 943
  Fort Totten, post of ........ I, 38, 927
Williamstown, W. Va.:
  Bridge of Ohio River Bridge and Ferry Company across Ohio River between Marietta, Ohio, and ........ I, 660
  Bridge of Williamstown and Marietta Bridge and Transportation Company between Marietta, Ohio, and ........ I, 661
Williamstown and Marietta Bridge and Transportation Company, bridge of ........ I, 661
Wilmington, Cal.:
  Construction of deep-water harbor in San Pedro Bay ........ I, 600; IV, 3397
  Improvement of inner harbor ........ I, 601; IV, 3399
Wilmington, Del., improvement of harbor ........ I, 246; II, 1335
Wilmington, N. C.:
  Defenses of ........ I, 6, 24, 812, 921
  Examination and survey of Cape Fear River at and above ........ I, 310; II, 1552, 1557
  Improvement of Cape Fear River above ........ I, 307; II, 1502
  Improvement of Cape Fear River at and below ........ I, 307; II, 1504
Wilson Harbor, N. Y., improvement of ........ I, 592; IV, 3353
Winnebago Lake, Wis. (*see* Fox River) ........ I, 525; IV, 2953
Winnibigoshish Lake, Minn.:
  Construction of reservoir dam ........ I, 444; III, 2309
  Operation and care of reservoir dam ........ I, 445; III, 2322
  Survey of flowage lines of reservoir ........ I, 451
Winyah Bay, S. C., improvement of ........ I, 314; II, 1582
Wisconsin Central Railway Company, bridges of ........ I, 667
Wisconsin Entrance, Duluth Harbor, Minn., improvement of ........ I, 507; IV, 2828
Wisconsin River, Wis.:
  Bridge across ........ I, 665
  Improvement of (*see* Fox River) ........ I, 525; IV, 2953

Witch Rock, Portland Harbor, Me., examination and survey for removal of ........ I, 133; II, 1009, 1015
Withlacoochee River, Fla., improvement of ........ I, 348; III, 1761
Wolf River, Memphis, Tenn. (*see* Mississippi River Commission) ........ I, 657; S., 3, 32
Wolf River, Wis. (*see* Ahnapee Harbor) ........ I, 519; IV, 2923
Wolf River, Wis., tributary of the Fox (*see* Fox River) ........ I, 525; IV, 2953
Woods Hole Channel, Mass., improvement of ........ I, 162; II, 1117
Worth Lake, Fla., bridge across ........ I, 667
Wrecks, etc., removal of ........ I, 117, 118
  Absecon Inlet, N. J., entrance ........ I, 262; II, 1351
  Appoquinimink River, Del ........ I, 263; II, 1352
  Atlantic City, N. J., entrance to Absecon Inlet ........ I, 262; II, 1351
  Atlantic City, N. J., in Atlantic Ocean ........ I, 263; II, 1353
  Atlantic Ocean, off Atlantic City, N. J ........ I, 263; II, 1353
  Atlantic Ocean, off Seabright, N. J ........ I, 223; II, 1247
  Back Creek, Md ........ I, 272; II, 1390
  Baltimore Harbor, Md., Fort McHenry Channel ........ I, 272; II, 1391
  Baltimore Harbor, Md., North Point Creek ........ I, 272; II, 1390
  Beaufort to Charleston, S. C., inland passage ........ I, 324; II, 1607
  Belle Isle, Detroit River, Mich ........ I, 570; IV, 3198
  Billingsport, N. J., below ........ I, 263; II, 1352
  Bridgeboro, N. J., above ........ I, 262; II, 1351
  Buttermilk Channel, New York Harbor, N. Y ........ I, 229; II, 1299
  Cambridge Harbor, Md ........ I, 272; II, 1390, 1391
  Cedar Creek, N. J ........ I, 263; II, 1352
  Charleston to Beaufort, S. C., inland passage ........ I, 324; II, 1607
  Chatham Harbor, Mass ........ I, 174; II, 1147
  Chesapeake Bay, near Craighill Channel light, Md ........ I, 272; II, 1391
  Chesapeake Bay, near Fort Monroe, Va ........ I, 298; II, 1462
  Chesapeake Bay, near Old Plantation light-house, Va ........ I, 298; II, 1462
  Chester Creek, Pa ........ I, 262; II, 1350
  Choptank River, Md., Cambridge Harbor ........ I, 272; II, 1390, 1391
  Cleveland Harbor, Ohio ........ I, 584; IV, 3269, 3270
  Communipaw Channel, N. J ........ I, 223; II, 1247
  Corner Stake light, off Staten Island, N. Y ........ I, 223; II, 1247
  Craighill Channel light, Chesapeake Bay, Md ........ I, 272; II, 1391
  Cumberland River ........ I, 463; III, 2417
  Cuyahoga River (Cleveland Harbor), Ohio ........ I, 584; IV, 3270
  Deals Island, Md ........ I, 272; II, 1390
  Delaware and Chesapeake Canal, Md., sunken logs ........ I, 272; II, 1390
  Delaware Bay and River ........ I, 262, 263; II, 1350, 1351, 1352
  Delaware Breakwater Harbor, Del ........ I, 263; II, 1351
  Dennis Creek, N. J ........ I, 262; II, 1350
  Detroit River, Mich ........ I, 570; IV, 3198
  Dover Island, Cumberland River ........ I, 463; III, 2417
  Duck Creek (Smyrna River), Del ........ I, 263; II, 1352
  Duluth Harbor, Minn ........ I, 514; IV, 2883
  East River, N. Y ........ I, 223; II, 1248
  Ellis Island, New York Harbor, N. Y., near ........ I, 223; II, 1248
  Erie Lake, off Cleveland, Ohio ........ I, 584; IV, 3269
  Erie Lake, off Sandusky, Ohio ........ I, 584; IV, 3269
  Flint River, Ga ........ I, 363; III, 1793
  Fort McHenry Channel, Patapsco River, Md ........ I, 272; II, 1391
  Fort Monroe, Va., off ........ I, 298; II, 1462
  Galveston Bay, Tex ........ I, 411; III, 1959
  Gloucester, N. J., off ........ I, 262; II, 1351
  Greenpoint, N. Y., off ........ I, 223; II, 1248
  Greenwood, Miss., Yazoo River ........ I, 420; III, 2048
  Hampton Roads, Va., off Fort Monroe ........ I, 298; II, 1462
  Hardings Beach, Chatham, Mass ........ I, 174; II, 1147
  Haverstraw, N. Y., off ........ I, 223; II, 1248
  Hudson River, N. Y ........ I, 223; II, 1248
  Island Beach, N. J., opposite ........ I, 223; II, 1247
  Jackson Creek, Md ........ I, 272; II, 1391
  League Island Navy-Yard, Schuylkill River, Pa ........ I, 263; II, 1352
  Long Island Sound, N. Y ........ I, 223; II, 1246
  Louisville and Portland Canal, Ky ........ I, 505; IV, 2816
  Manokin River, Md ........ I, 272; II, 1390

- Wrecks, etc., removal of—Continued.
  - Michigan Lake-Sturgeon Bay Canal, Wis. . . . . I, 527; IV, 2970
  - Mississippi River, above Missouri River . . . . . I, 440; III, 2231
  - Mississippi River, below Missouri River . . . . . I, 434; III, 2166
  - Mobile River, Ala . . . . . I, 378; III, 1853
  - Monroe, Fort, Va., off . . . . . I, 298; II, 1462
  - Nauset Harbor, Mass . . . . . I, 159; II, 1091
  - Newark Bay, off Corner Stake light. . . . . I, 223; II, 1247
  - New Jersey-Staten Island channel . . . . . I, 223; II, 1247
  - New York Harbor, N. Y., Buttermilk Channel. . . . . I, 229; II, 1299
  - New York Harbor, N. Y., Communipaw Channel . . . . . I, 223; II, 1247
  - New York Harbor, N. Y., near Corner Stake light . . . . . I, 223; II, 1247
  - New York Harbor, N. Y., near Ellis Island . . . . . I, 223; II, 1248
  - New York Harbor, N. Y., off Greenpoint. . . . . I, 223; II, 1248
  - New York Harbor, N. Y., Sandy Hook . . . . . I, 229; II, 1299
  - North Point Creek, Patapsco River, Md. . . . . I, 272; II, 1390
  - Odessa Landing, Appoquinimink River, Del. . . . . I, 263; II, 1352
  - Ohio River . . . . . I, 473; IV, 2646
  - Ohio River, Louisville and Portland Canal, Ky. . . . . I, 505; IV, 2816
  - Old Orchard Shoal light, Raritan Bay, N. J., near . . . . . I, 223; II, 1247
  - Old Plantation light-house, Chesapeake Bay, Va., near. . . . . I, 298; II, 1462
  - Patapsco River, Md., Fort McHenry Channel . . . . . I, 272; II, 1391
  - Patapsco River, Md., North Point Creek. . . . . I, 272; II, 1390
  - Philadelphia, Pa., Schuylkill River. . . . . I, 262, 263; II, 1350, 1352
  - Pollock Rip light-ship, Mass., near . . . . . I, 174; II, 1147
  - Port Chester Harbor, N. Y., off . . . . . I, 223; II, 1246
  - Porto Rico, San Juan Harbor . . . . . I, 657; V, 3635
  - Rancocas River, N. J . . . . . I, 262; II, 1351
  - Raritan Bay, N. J. . . . . I, 223; II, 1247
  - Riverton, N. J., below . . . . . I, 262; II, 1351
  - Robinsons Hole, Vineyard Sound, Mass . . . . . I, 174: II, 1147
  - St. Clair River, Mich. . . . . I, 570; IV, 3198
  - Sandusky Harbor, Ohio. . . . . I, 584; IV, 3269
  - Sandy Hook, N. J . . . . . I, 229; II, 1299
  - San Francisco Bay, Cal . . . . . I, 613; IV, 3434
  - San Jacinto River, Tex. . . . . I, 411; III, 1959
  - San Juan Harbor, Porto Rico . . . . . I, 657; V, 3635
  - Savannah Harbor and River, Ga. . . . . I, 334; II, 1660
  - Schuylkill River, Pa . . . . . I, 262, 263; II, 1350, 1352
  - Seabright, N. J., off . . . . . I, 223; II, 1247
  - Ship John light, Delaware Bay . . . . . I, 263; II, 1350
  - Shovelful light-ship, Mass., near . . . . . I, 174; II, 1147
  - Shrewsbury River, N. J . . . . . I, 223; II, 1247
  - Smyrna River, Del. . . . . I, 263; II, 1352
  - Stage Harbor, Mass., on Hardings Beach. . . . . I, 174; II, 1147
  - Staten Island-New Jersey channel. . . . . I, 223; II, 1247
  - Sturgeon Bay and Lake Michigan Canal, Wis. . . . . I, 527; IV, 2970
  - Superior Bay, Duluth Harbor, Minn . . . . . I, 514; IV, 2883
  - Tangier Sound, Md., Deals Island. . . . . I, 272; II, 1390
  - Vanland Landing, Yazoo River, Miss. . . . . I, 420; III, 2048
  - Vineyard Sound, Mass., near Robinsons Hole . . . . . I, 174; II, 1147
  - Wysocking Bay, N. C. . . . . I, 309; II, 1511
  - Yazoo River, Miss . . . . . I, 420; III, 2048
- Wrightstown, Wis., bridge of town of, across Fox River . . . . . I, 662
- Wyandotte, Mich. (*see* Detroit River) . . . . . I, 571; IV, 3208
- Wysocking Bay, N. C., removal of wreck . . . . . I, 309; II, 1511

## Y.

- Yalobusha River, Miss., bridge at mouth of Martins Creek. . . . . I, 660
- Yamhill River, Oreg.:
  - Improvement of . . . . . I, 631; V, 3550
  - Operating and care of lock and dam. . . . . I, 632; V, 3555
- Yankton, S. Dak., improvement of Missouri River at. . . . . I, 452, 454; III, 2373, 2375
- Yaquina Bay, Oreg.:
  - Examination of. . . . . I, 622; V, 3485
  - Improvement of . . . . . I, 620; V, 3482

Yazoo River, Miss.:
  Improvement above mouth....... I, 420; III, 2048
  Improvement of mouth, including Vicksburg Harbor....... I, 421; III, 2052
  Removal of wrecks....... I, 420; III, 2048
"Y" Bridge, across Muskingum River at Zanesville, Ohio....... I, 659
Yellow Mill Pond, Bridgeport, Conn. (*see* Bridgeport)....... I, 186; II, 1177
Yellowstone National Park, improvement of....... I, 682; V, 3777
Yellowstone River, Mont., bridge at Glendive....... I, 659
York Harbor and River, Me., bridge (Sewells) obstructing navigation....... I, 667
York River, Va., improvement of....... I, 286; II, 1417
Yuba River, Cal. (*see* Sacramento River *and* California Débris Commission)....... I, 608, 656; IV, 3420, V, 3625

Z.

Zanesville, Ohio:
  Bridge across Muskingum River at ("Y" Bridge)....... I, 659
  Bridge across Muskingum River Canal at....... I, 667
*Zeus* (canal boat), removal of wreck of....... I, 263; II, 1352
Zoological Park, Washington, D. C....... I, 676; V, 3689

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